TECHNOLOGY DEPT.

Gas Journal

VOL. 287. 108th YEAR. LONDON, AUGUST 22, 1956. No 4858. PRICE 1/6

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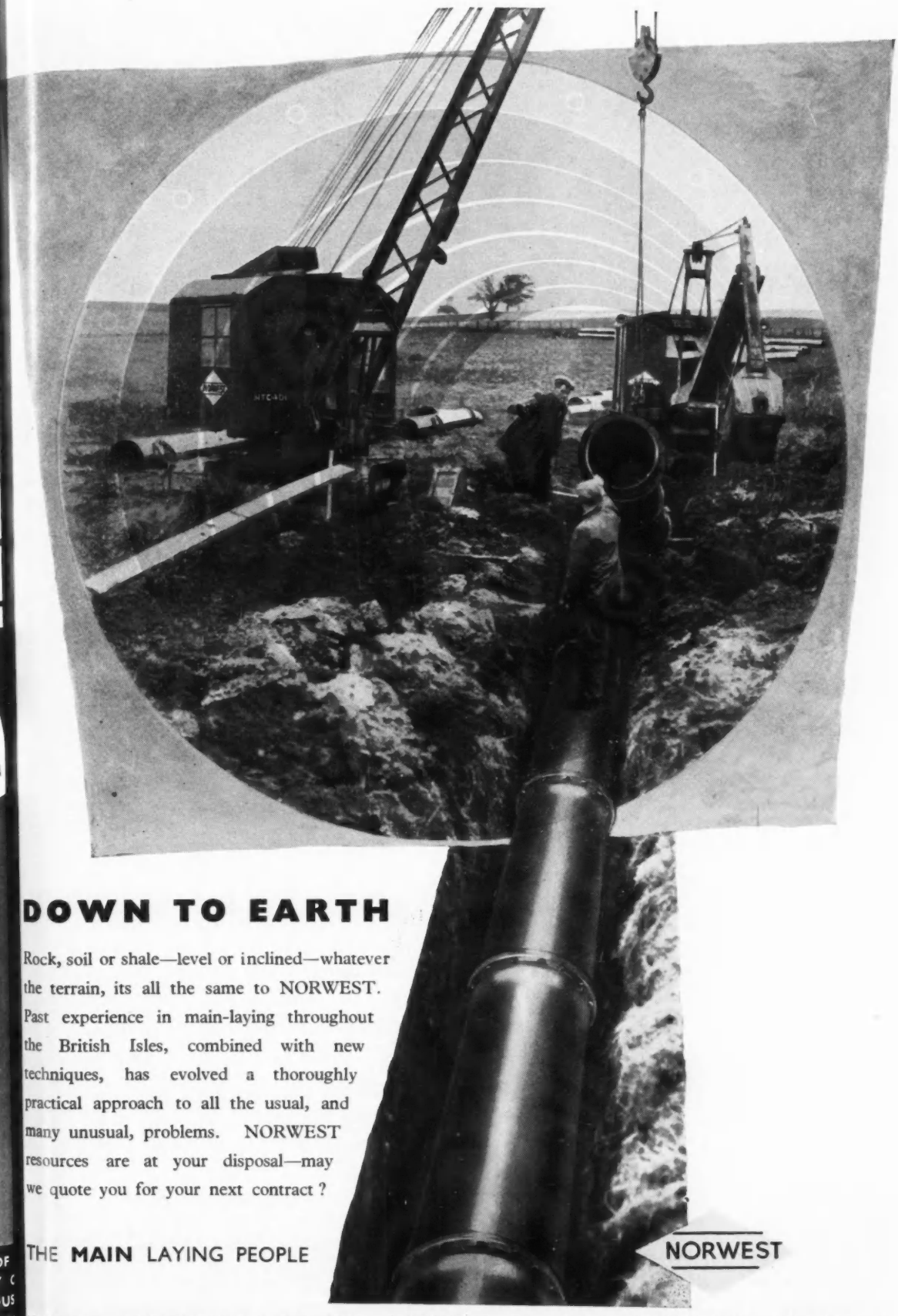

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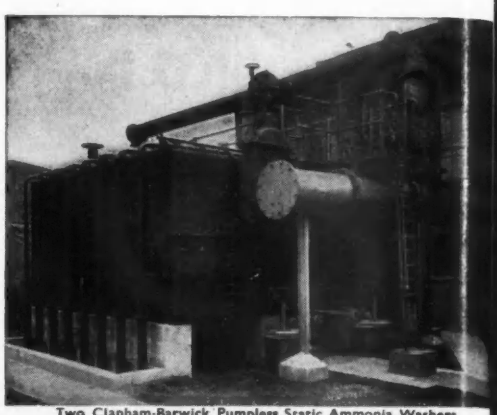

Two Clapham-Barwick Pumpless Static Ammonia Washers

Internal deck level view of the Purifier Installation. (Eight 45 Feet Square Boxes.)

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- Washers (Pumpless Patent)
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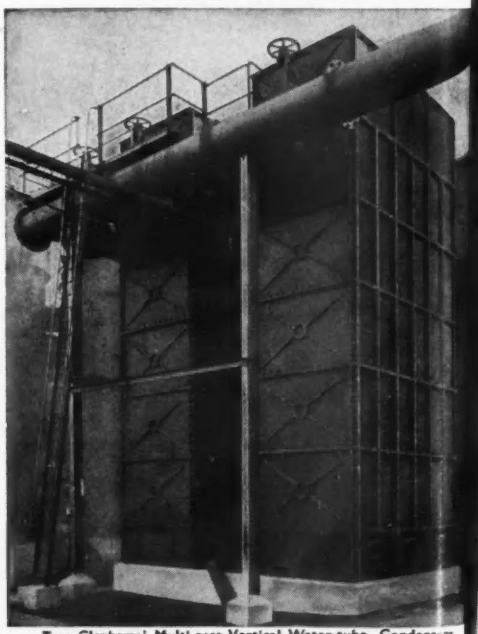

Two Claphams' Multi-pass Vertical Water-tube Condensers.

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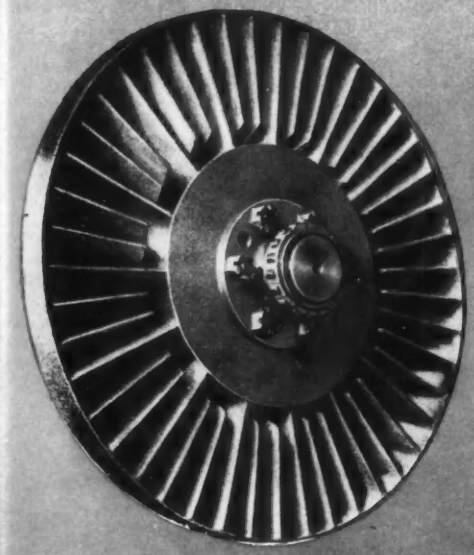

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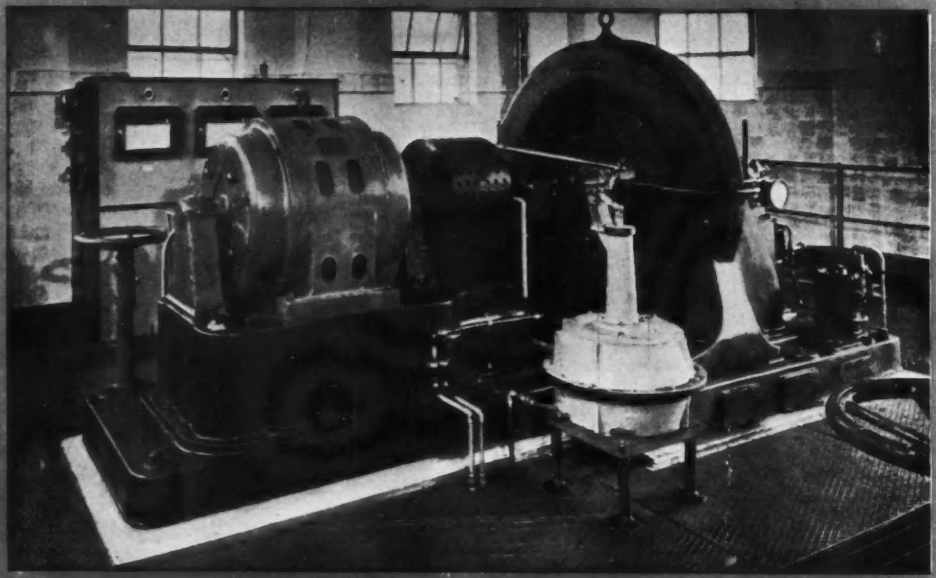

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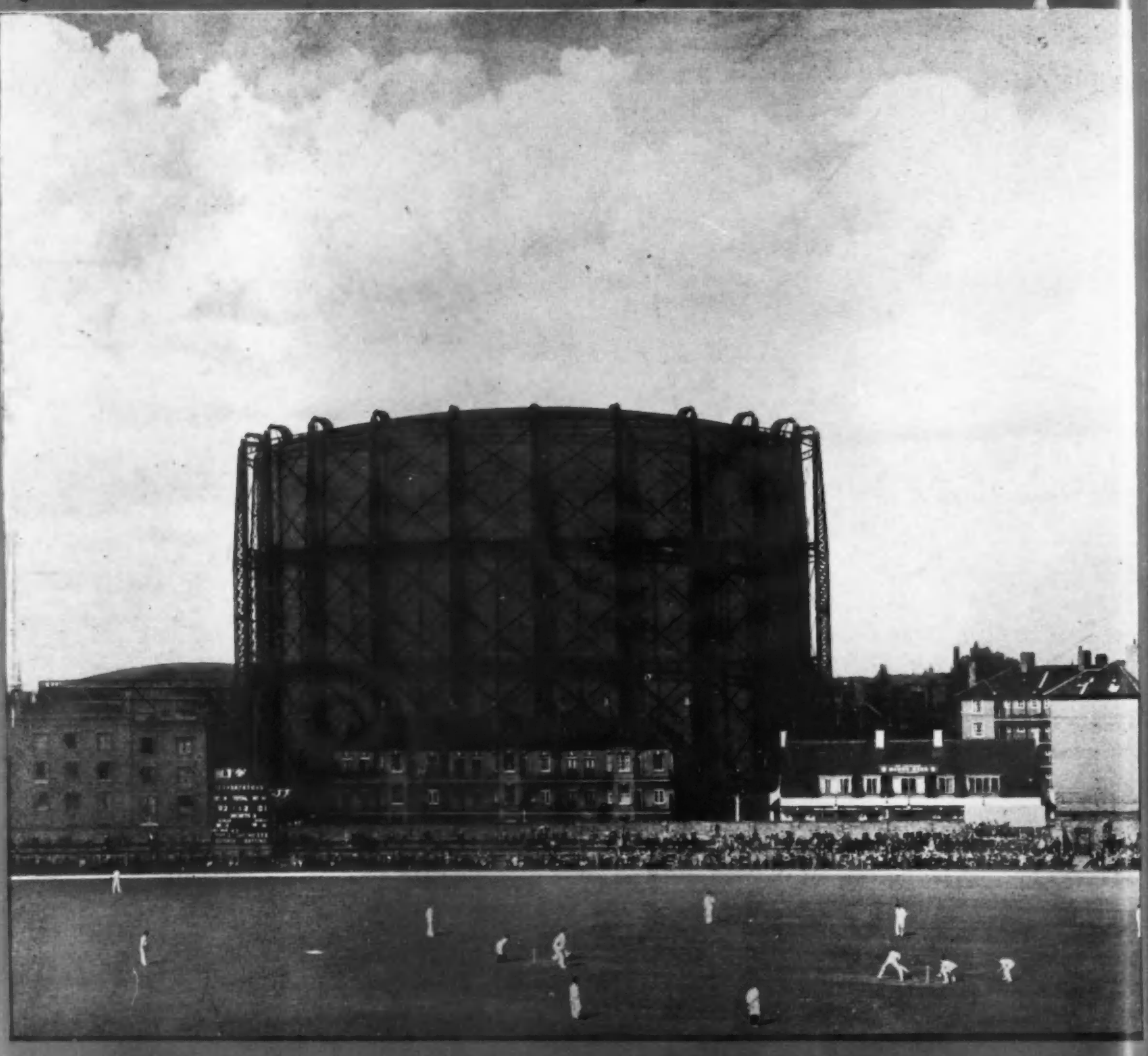

CRAFTMANSHIP AT ITS BEST
ON AND OFF THE FIELD

The 6 million Frame Guided Gasholder at Kennington Oval, was reconstructed following war damage, by Clayton's of Leeds: in the background . . . the new 2 million Spiral Guided holder, also erected by Clayton's to replace another war-damaged Holder.

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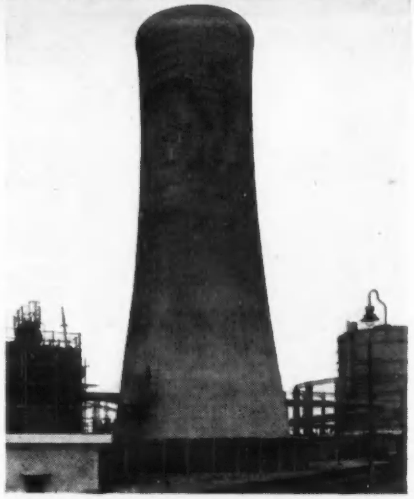

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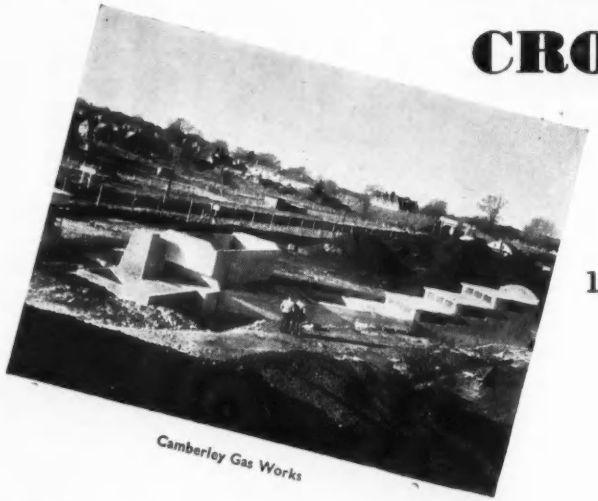

Camberley Gas Works

South Eastern Gas Board

Photo by courtesy of "The Motor"

THE JAGUARS OF THE ECURIE ECOSSE RACING STABLE, owned and managed by David Murray of Edinburgh, by their signal success at Le Mans, aptly express an outstanding feature of A. & M. Meters . . .

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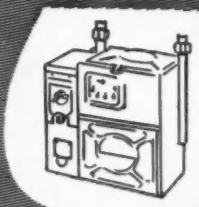
THE MINIMETER is the famous **SMALL SCOTCH** that gives **Trouble-Free Running** in most compact form



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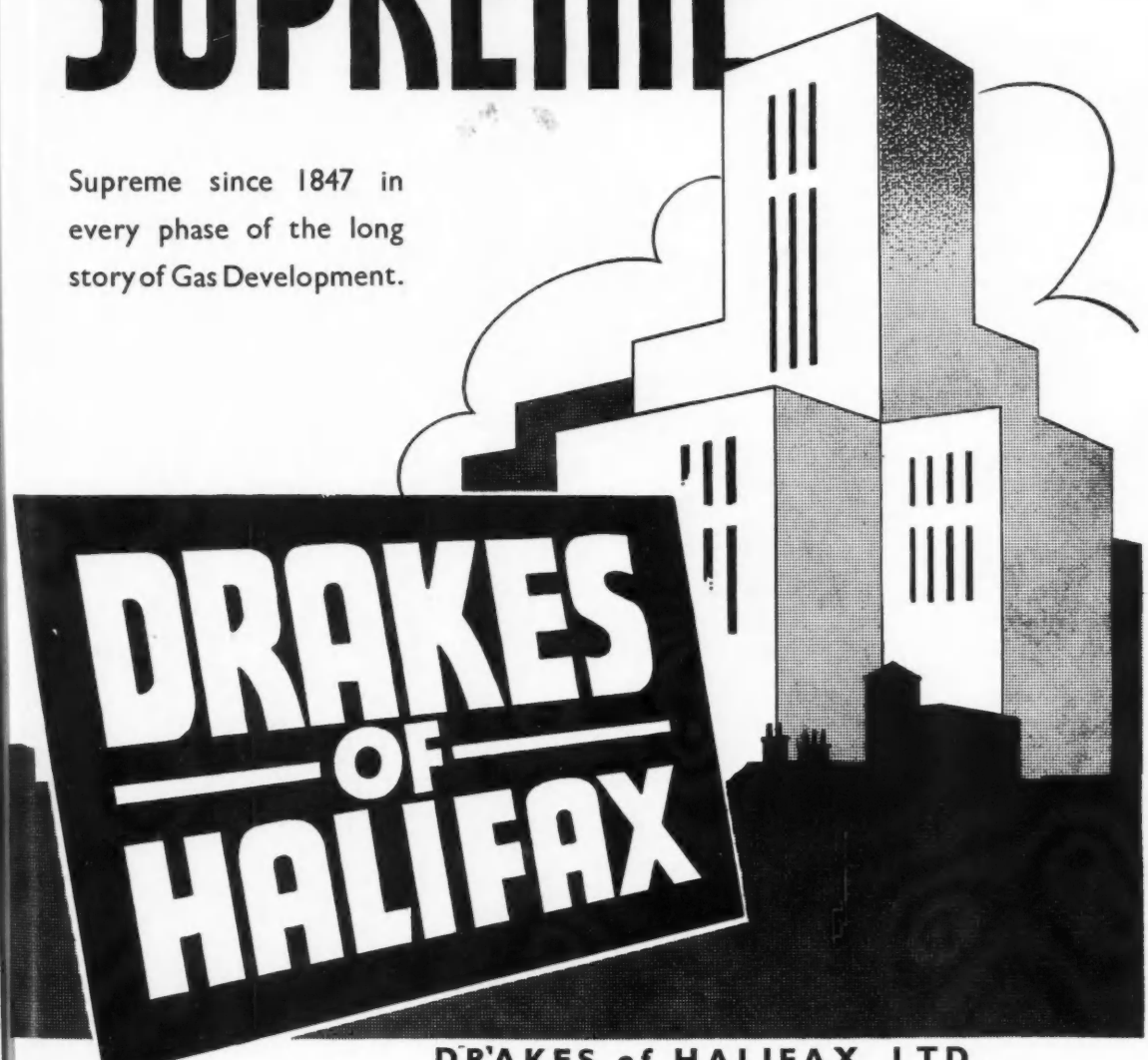

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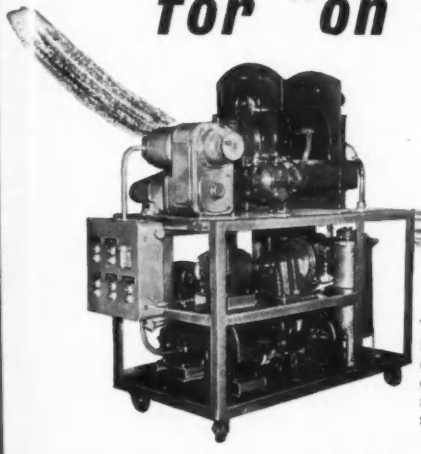
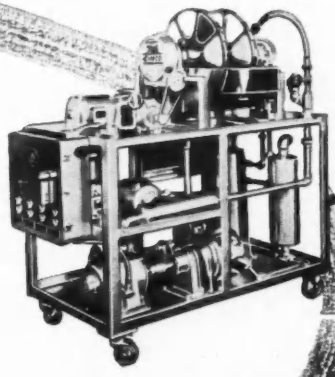
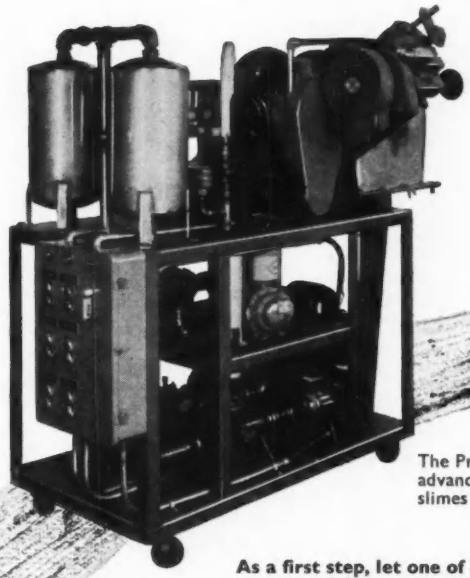


Eimco pilot plant filters, complete with all ancillaries, make it possible to take the plant to the sample, avoiding the possibility of change in the sample during transit, allowing extensive large-scale tests and giving accurate data to establish the optimum plant size and operating conditions.

The Rotary Vacuum Drum Filter can be arranged for either single or double solution operation, top or bottom feed, and scraper, string, roller or snap-blow discharge.



The Disc Filter, affording greater filter area per square foot of floor space, is particularly useful where no cake washing is required.



The Precoat Drum Filter is arranged with an automatic knife advance mechanism for shaving the precoat, thus removing slimes as they are deposited and allowing free filtration.

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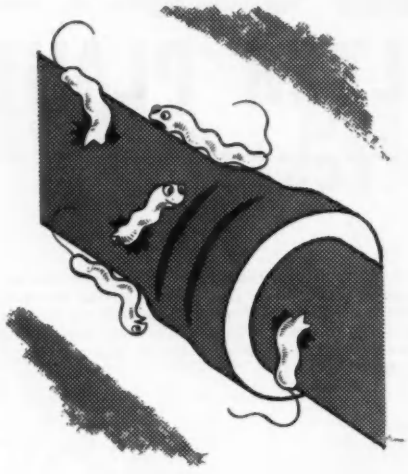
Keep DESULPHOVIBRIO DESULPHURICANS *Out of Your Steelwork!*



These beastly little nuisances have a disastrous effect on steelwork, and are in fact responsible for the greater part of underground corrosion.

One of the best ways of suppressing their activities is the use of TANNINS – and the most effective of these have been incorporated in DENSO TAPES, greatly increasing their already considerable potency in the battle against corrosion.

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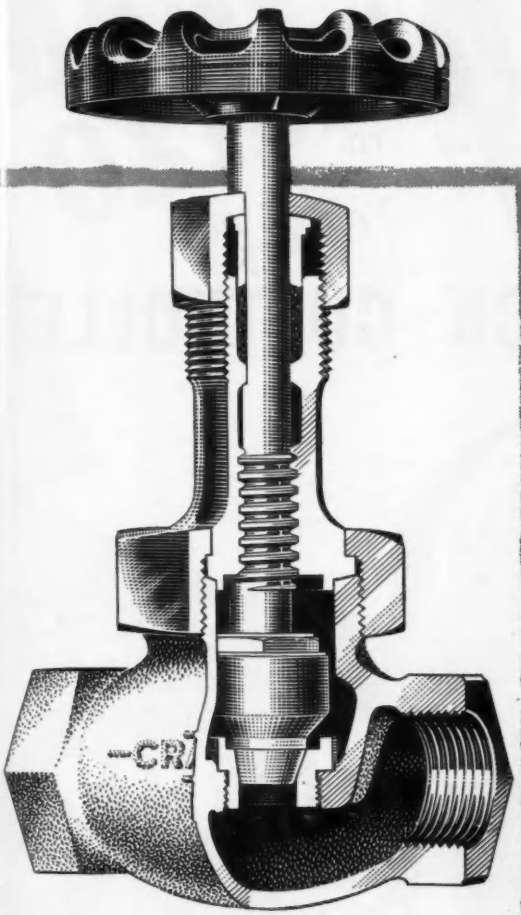

D46 Sizes: Screwed ¼"-3" Flanged ½"-3"

Screwed Hexagon ends with British Standard Taper Threads —or to American Standards. Flanged in accordance with British Standard Tables 'F' or 'H' diameters—or to American Standards.

Crane Bronze Check Valves D122 or D145 are recommended for use with these valves.

CRANE BRONZE GLOBE VALVES

with renewable Nickel Alloy Disc and stainless steel seat ring

This Globe Valve, designed for services under really rigorous conditions, is one of a series of Crane Bronze Valves—all of reliable and sturdy construction. The plug type nickel alloy disc and the stainless steel seat ring effect an extremely tight closure whilst allowing close regulation of flow when throttling. The two dissimilar metals were chosen after extensive metallurgical tests as offering the best resistance to corrosion and 'wire-drawing' or damage by foreign matter. Both disc and ring are moreover renewable and additional discs and rings can be supplied.

These valves are recommended for working pressures up to 250 pounds (steam 500°F); 500 pounds (water, oil or gas, cold, non-shock). Manufactured from the usual Crane high grade materials and, like all Crane products, they are individually tested. Sizes 2" and smaller have a union bonnet—larger sizes a bolted bonnet, inside screw. Both features make for ease of dismantling or reassembly after maintenance. Back-seating allows the valves to be repacked whilst fully open under pressure.

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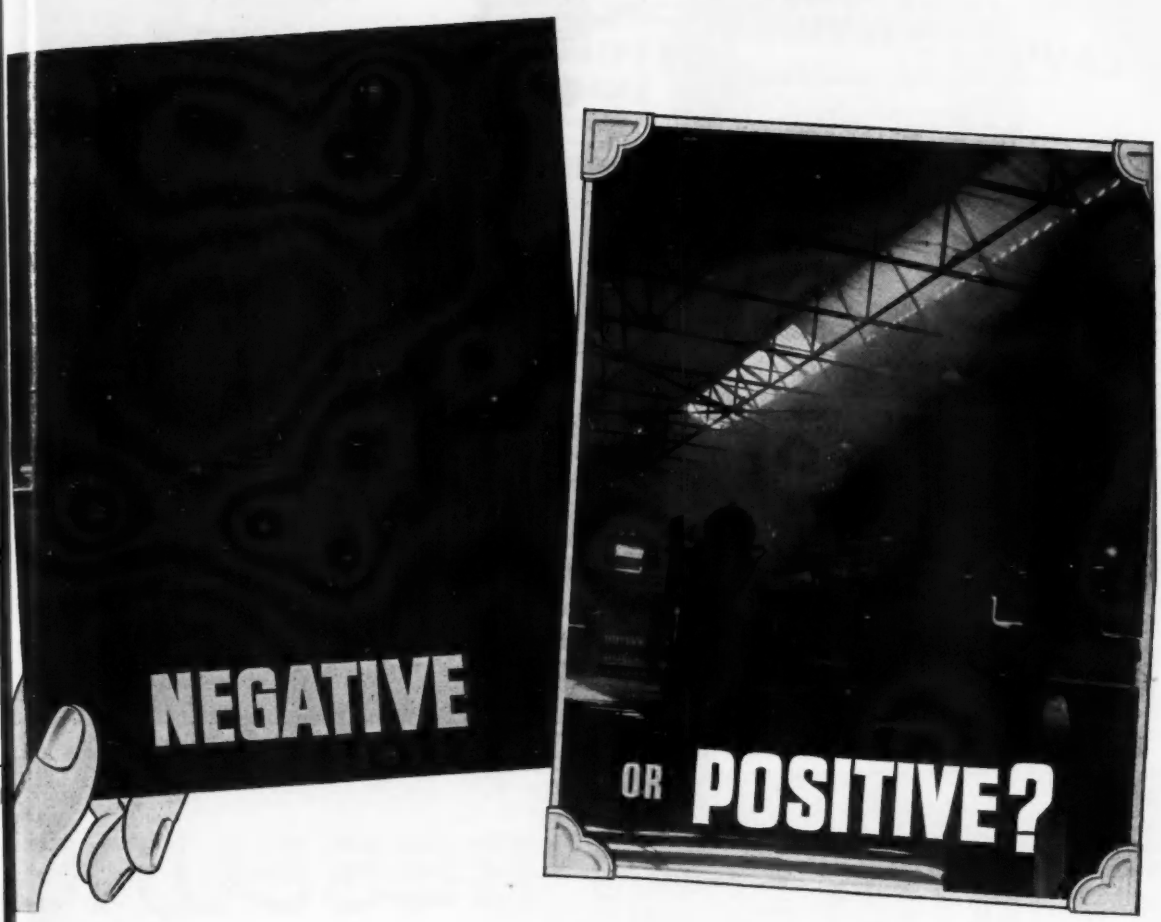

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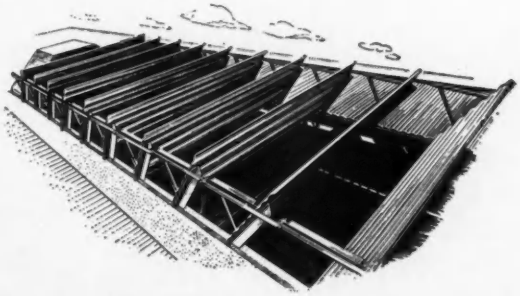

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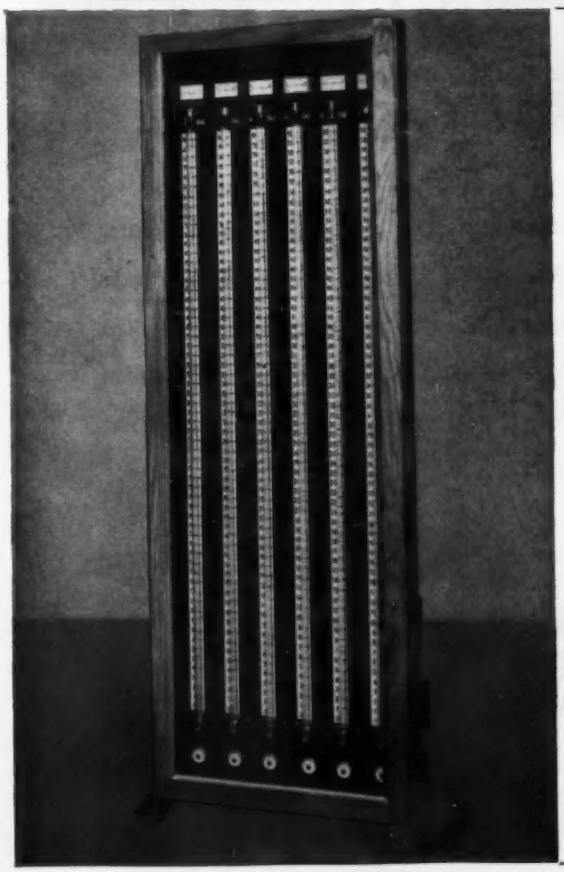

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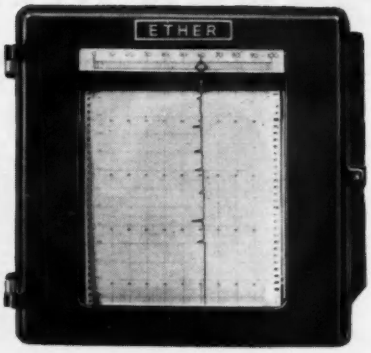

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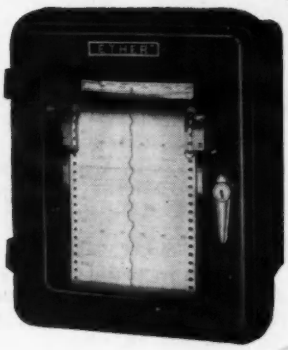

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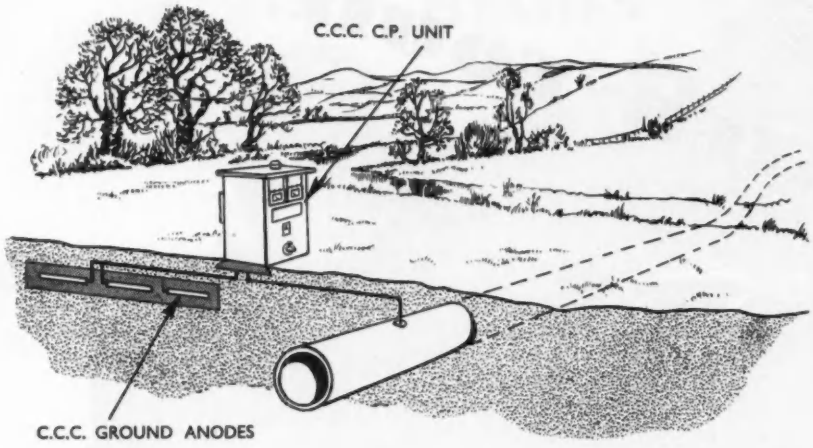
C.C.C. PROTECTION for BURIED PIPELINES



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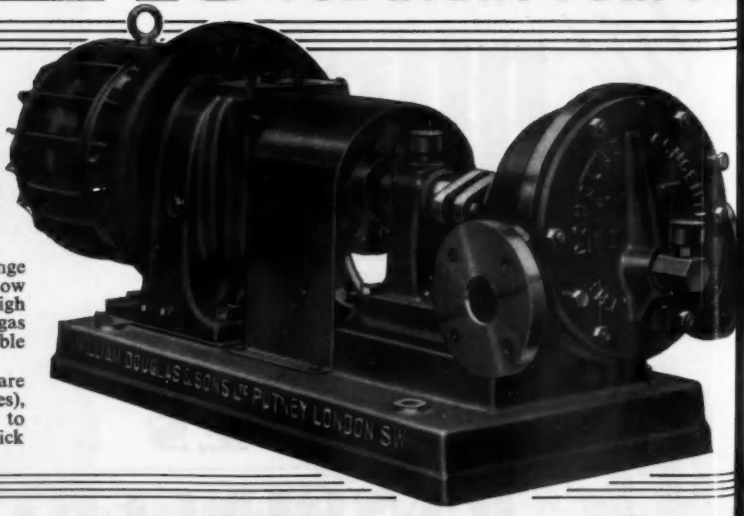

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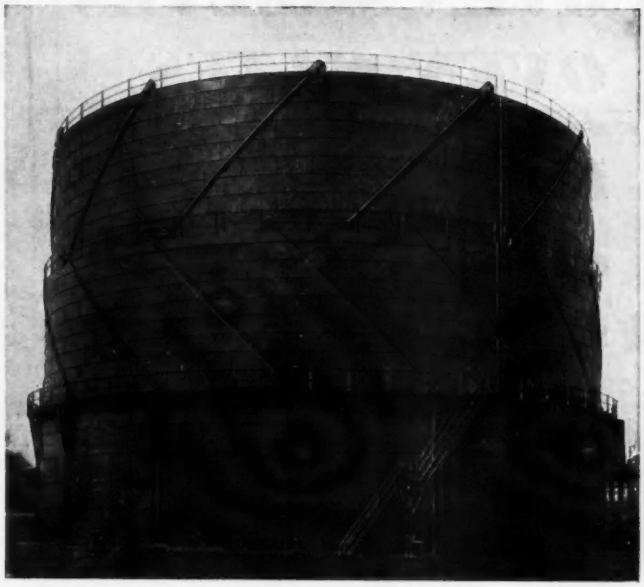

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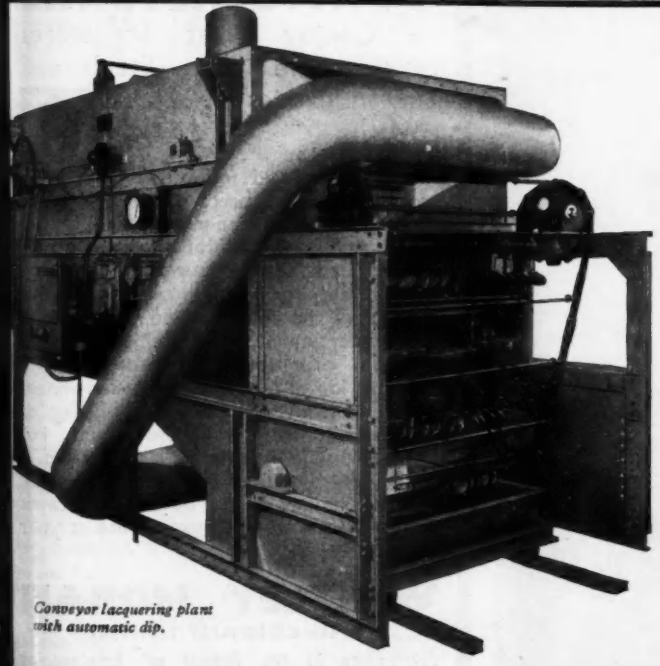

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Gas Journal

VOL. 287 NO. 4858 August 22, 1956

108TH YEAR

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1956

Gas Journal

VOLUME 287. No. 4858. AUGUST 22, 1956. 108th YEAR

In Defence of Competition

SINCE their nationalisation both the gas and electricity industries have claimed that to compete each with the other is in the interests of the consumer; if either becomes a monopoly, they say, a smugness and a laxity may result. It is true that a certain school of thought in electrical circles holds that gas should give up the fight because, logically, cheapness and efficiency lies in a one-fuel installation; but since the powers that be show no signs of declaring the gas industry redundant, they accept the fact that electricity must do battle, and may the best man win.

However, our eye was caught by a particularly thoughtful and interesting letter published in a recent issue of the *Electrical Review* which revealed an interesting variation on this theme. Cautioning against placing too much reliance upon competition between the nationalised fuel industries, the writer, Mr. F. L. Waring, an electrical engineer, maintains that there are many anomalies caused by financial competition. For instance, he says, the Coal Board are reluctant to spend their restricted capital to make coke and sell gas, though there are many instances where this is desirable. On the other hand, the steel industry must have coke for ironmaking and thereby produces large volumes of coke oven and blast furnace gas which, since they cannot sell at an economic price and the gas boards cannot buy at a competitive price, is burnt in boilers and used to produce electricity in small power stations. These stations cannot operate at the efficiency of modern power plants and the electricity board cannot afford to purchase the power at a price higher than that at which they could generate for themselves.

Each organisation, states the letter, must show a profit on the transaction or it refuses to take part and thereby competition has justified itself. The only sufferer is the nation—by excessive capital expenditure and inefficiently used fuel, the life blood of our country. If this can happen at generation level, what must be happening on the distribution side? Is it not possible, instead of duplicating coal, gas, oil and electricity services to every street in the kingdom that, by rationalisation, charges could be reduced out of all proportion to the savings of unhealthy competition? Give me a lot more integration, concludes Mr. Waring.

There may be some on this side of the fence who think the writer has a point or two there, but we would like to take the writer up on his parting shot. Quite obviously he does not mean that some streets should be served only by coal, others only by gas, and yet others only by oil or electricity. Although he does not say so directly, Mr. Waring is implying that electricity should be used to supply all heat, light and power demands in British homes. What a dismal prospect! Everyone must surely agree that for light and power electricity is pre-eminent, but when it comes to heat, the average householder is not going to put up with what one might term a mess of wattage. It is not so much a question of efficiency; it is a question of human rights. It is one thing to force the householder to alter his heating methods in the interest of public health, but it is a very different matter to deny him the freedom to choose his method of space heating and cooking.

For a start it would deprive the majority of Britain's housewives of their chosen fuel for cooking and of their much-loved solid fuel fire. Presumably Mr. Waring would argue that they would gladly give up these time-honoured favourites when they found how cheaply and excellently electricity filled the breach. But would it? What guarantee is there that, safely enshrined in their monopoly, the electrical powers would reduce their charges in the manner suggested? One has only to think of other monopolies—coal, for example—to see what can happen. (And, let's face it, would a gas monopoly be any safer?) Workers in that industry would be in a fantastically strong position—many times stronger than they are now, which is saying a good deal—and they could twist the nation's tail with impunity. And as for efficient service, gone would be those delight-

ful battles in the newspaper correspondence columns in which the merits of electricity fitters are contrasted with those of gas. Commercial officers in the gas industry *know* that a mess-up by their service department is as good a way as any of sending a consumer over to the enemy and there is no lack of cases in which a housewife with an electrical bias has settled down happily with a gas cooker simply because electricity in the form of a salesman, a fitter, or even a power cut, had defaulted.

The cost of competition is, we are sure, less than the critics maintain, and the ballyhoo of publicity of advertising is a mere drop in the ocean. Basically, we think more is involved than fuel efficiency and cost—this is a question of human values. With competing industries and a choice of four fuels life is so much more interesting. In a world which becomes more stereotyped every day, isn't that worth something?

The Automation Age

HOW will the history of the Automation Age be written? Will a civilised philosophy, roughhewn from the rapid development of production methods since the Industrial Revolution, manage to prevail? Or will the Age be born out of shambles and strife, not to bestow its undoubted wealth until future generations? It would indeed be pleasant to contemplate the prospect in the context of atomic power, but it seems that, as at the beginning of the Iron Age, the enormous potential of a newly-mastered material is first to be used to hold civilisation to ransom before blossoming as a benefactor to man.

The replacement of human labour by mechanical techniques has, of course, been essential to 20th-century expansion; and the process has been fought many times by those who would smash the machines for fear of unemployment. But the Welfare State is replacing the poverty that gave rise to such stupidity and it is clearly understood that no such attitude exists today. What is demanded is that the introduction of electronic operation of machinery is accompanied by long-sighted planning which ensures the proper distribution of its benefits. The capital, ingenuity and foresight of those who turn their plant over to automation are, in fact, ensuring the economic survival of this nation, at any rate. But planning must accompany the process so that the continuity of the weekly pay packet is ensured. This does not seem much to ask.

Governmental planning is, surely, particularly important in a mixed economy like ours. Nationalised industries—which are the key industries—must adopt the new techniques where they can, and constantly seek to integrate the straggling bits and pieces of their inheritance. But at the same time the temptation to the gas industry, for example, which has a remarkable record of security for its employees, to delay any advance which involves pruning, is obvious. And it must be agreed that in any nationalised industry the sort of conduct prevailing in the motor car industry just lately would be politically unthinkable.

It is an ironic fact that restrictions on capital investment, naturally and artificially imposed in this country, will at least keep redundancy down to manageable levels for the time being so that, subject to ordinary humane treatment being administered, the absence of an overall plan will not be missed for a while. It is only to be hoped that advantage is taken of the breathing space to put into action one or more of the many theories offering a solution to this problem.

The very heart of the matter appears to have been touched upon at a meeting of trade union organisations under the auspices of the European Productivity Agency at Transport House recently. An E.P.A. Bulletin gives the impression that most delegates expressed uniform fears about whether there would be enough technicians and engineers to meet the demands of automation. 'Everyone realises,' says the Bulletin, 'that automatic techniques must logically result in the decline and eventual disappearance of the simplest trades requiring practically no training (manual operatives and clerical staff), accompanied by increasing demand for much more highly skilled jobs. This means that our vocational training institutions, already inadequate for present requirements, will, unless immediate steps are taken, be helpless to deal with the situation. However, the training of new generations of workers adapted to the industrial requirements of tomorrow, is only part of the problem. The need to train re-deployed workers who have had to acquire new skills to take the place of their obsolete qualifications, will also have to be faced.'

This reference refers to the facilities offered by European countries generally and some countries, including our own, are more advanced than others in this respect. But that does not alter the fact that our technical education programme is pathetically inadequate to meet the dawn of any new era.

. . . *And the Monroe Age*

LINK-UP, the North Western Gas Board's house journal, had to survive considerable adverse comment before it emerged triumphant as one of the most popular magazines of its kind. Its success was due to the thoughtfulness of an editor who reasoned that the purpose of a house journal was to present facts in an interesting way. So, he thought, why not adorn the facts with figures? Gorgeous figures, 38-23-38 figures? As the well-known actress had said to reporters at the airport when asked to what she attributed her success: "Sincerity, boys, Sincerity, and Sex.'

Emgas, too, has now introduced East Midlands Gas employees to the Personality Cult. Its July front cover depicts a three-dimensional young lady lowering herself into the swim with a smile suggesting that the deep end might be a lot warmer than you thought. Any misgivings we may have had because this picture has taken longer to reach our 'Out' tray than the entire transactions of the World Power Conference—well, nearly—were dispelled by the fact that the *Rotherham Advertiser* had also regarded the issue with a benevolent eye and expressed its pleasure at 'an absence of that crusty officialdom which so often characterises these semi-governmental departments.'

Provided the Cult encourages the reading of serious news besides, and does not lower itself to speaking of 'News in Briefs' we see nothing but virtue—loosely speaking—in the efforts of house magazines to keep up with the competitive pace set by popular periodicals.

That an editor should recognise other forms of uplift besides the moral variety shows that he is *en rapport* with his readers. After all he must gain the interest of his readers before he can attract them to what information or comment he has to impart. Today it is accepted that in conveying a piece of information to the public the shortest distance between two points can be a curve.

Personal

MR. H. R. HART has been appointed General Manager of the Glasgow Division of the Scottish Gas Board. Mr. Hart commenced his employment in the gas industry with the Gas Light and Coke Company in 1929. He later transferred to the service of the North Middlesex Gas Company and became Sales Manager in 1936. At the outbreak of war he was mobilised as a Territorial Army officer where he served with the Royal Artillery. He was demobilised with the rank of Major. He returned to the North Middlesex Gas Company as Sales and Service Manager until vesting day when he was appointed Commercial Manager of the East Midlands Gas Board. Mr. Hart is a Fellow of the Royal Statistical Society, and was a member of the British gas industry productivity team which toured America in 1952.

MR. E. G. SMITH has been appointed Deputy General Manager of the Glasgow Division of the Scottish Gas Board. Mr. Smith commenced his employment in the gas industry in the Dumbarton Corporation Gas Department in 1923. After the completion of his apprenticeship he held several appointments with the Dumbarton undertaking before becoming Assistant Engineer and Manager in 1933. In 1941 he became Engineer and Manager of the Dumbarton undertaking and two years later he was appointed Engineer and Manager of the Dunfermline Corporation Gas Department. Since vesting date he has been Deputy Divisional Controller of the Glasgow Division of the Scottish Gas Board. Mr. Smith is a past President of the Scottish Association of Gas Managers and the Scottish Junior Gas Association (Western District).

MR G. H. ROSAM, Overseas Manager of Ascot Gas Water Heaters Ltd., will be visiting the United States, Canada and Mexico for the second time this year to promote the sale of this Company's products, with special emphasis on their latest appliance, the Ascot '724' central heating unit. During the trip, which will last about six weeks, visits will be made to both the American and Canadian Gas Associations. On his way home he will probably visit the Ascot agents in Hong Kong.

MR. W. G. PHILLIPS, Commercial Manager of the Watford Division, Eastern Gas Board, has been appointed Divisional General Manager of the Norwich Division with effect from October 1. He takes the place of MR. R. A. WESTON, who retires. MR. B. WILKINSON, Divisional Planning Engineer, Watford Division, has been appointed Divisional Engineer, Ipswich Division, with effect from September 1.

MR. ROBERT CARGILL, foreman at the gasworks at Tayport, near Dundee, has retired after more than 47 years' service. The Works Manager, Mr. David N. Garrie, presented him with a china table lamp from the staff.

SIR HAROLD SMITH AND DEPUTY REAPPOINTED

THE Minister of Fuel and Power has reappointed Sir Harold Smith as Chairman of the Gas Council when his present term of office expires on December 31, 1956. The Minister has also reappointed Sir Henry Jones as Deputy Chairman of the Council from February 1, 1957.

MISS E. E. C. MACALISTER, who has retired after 33 years' service in the gas showrooms at Bathgate, West Lothian, was presented last week with a petit point dressing table set by Mr. William Stewart, District Manager of the Scottish Gas Board, Armadale area, on behalf of the staff.

MR. F. SMART, who has served for 38 years as a blacksmith at the Rugby gasworks has received a presentation on behalf of the staff and employees on his retirement. Mr. Smart is 71.

Diary

September 4.—EAST MIDLANDS G.C.C.: Nottingham Chamber of Commerce, Smithy Row, Nottingham. 11.30 a.m.

September 4.—SOUTH EASTERN G.C.C., Caxton Hall, Westminster, S. W. 1., 11 a.m.

September 5.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

September 10.—NORTHERN G.C.C., 30, Grainger Street, Newcastle upon Tyne, 11.15 a.m.

September 19.—SCOTTISH ASSOCIATION OF GAS MANAGERS: Golf Circle A.G.M., Curling Hall Hotel, Largs, 5.30 for 5.45 p.m.

September 21.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Visit to the Works of W. J. Jenkins & Co. Ltd., Retford, Notts.

September 24.—WEST MIDLANDS G.C.C.: Committee Room 'C', City of Birmingham Education Department, Council House, Margaret Street, Birmingham 3. 2.30 p.m.

September 26.—NORTH WESTERN FUEL LUNCHEON CLUB: Opening session.

New London Office

The London office of Dallow Lambert and Co., Ltd., of Thurmaston, Leicester, manufacturers of dust control equipment for industry, has been moved to 6, Stratton Street, W.1 (telephone: GROsvenor 4766; telegrams: 'Deduster Wesphone,' London).

Indian Grid to Cover 5,000 Sq. Miles

A NEW gas grid covering 5,000 sq. miles of the industrial belt including Calcutta, Rourkhela steel plant, Chittaranjan locomotive works, and Tatanagar has been suggested to lighten the load of railway freighting.

Great increases are being planned in coal production which will take heavy toll of the railway freighting capacity; thus the grid will be a welcome relief for them.

Four steel works, with their own coke ovens, and several coke plants already functioning or being planned, are situated within the proposed grid, and experts estimate that there will be 100 mill. cu.ft. of gas to spare from these which, if piped, could be used by millions of consumers who otherwise use large quantities of raw coal.

COAL OUTPUT SUFFERS FALL

A heavy fall in coal output, one-third of a million tons, was recorded for the week ended August 4; this reduces the total to 2.3 mill. tons, the lowest weekly total this year. Although distributed stocks were 30% higher than last year at 18.39 mill. tons, they were 580,000 tons lower than the week before.

Electricity sales fell by 128.9 mill. units bringing the total for the week ended August 10 to 957.6 mill. units. Gas available in the week ended August 5 was 701.3 mill. cu.ft. lower than the week before, making the total 8,051.7 mill. cu.ft.

N. Ireland Works to Close Down

The Cookstown Gas and Light Co., Ltd., have notified their consumers and customers that their works are to close and no supplies of gas will be available after the end of March, 1957.

The reason given for the closure is steadily increasing costs in the manufacture and sale of gas, coke and tar.

The Company was formed in 1851.

Hungary's First Coke and By-Products Works Begins Production

HUNGARY'S first coking works has begun operations. It will supply coke to the Stalin iron and steel-works, as well as producing domestic coke. And when the whole works is completed, it will also produce 100 mill. cu.m. of domestic gas each year.

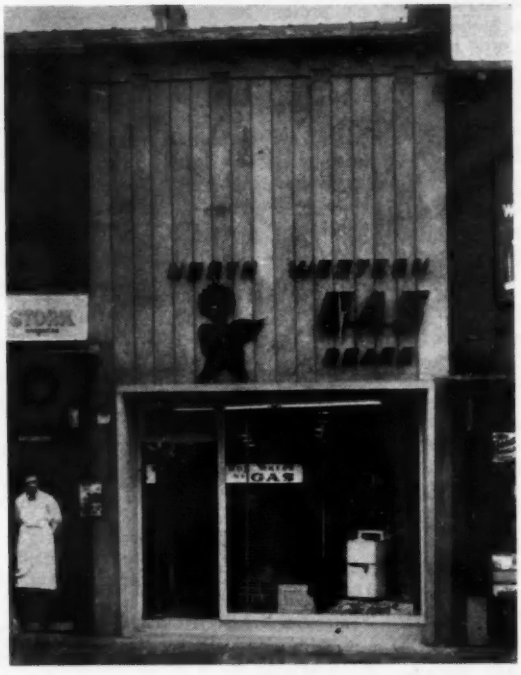
The coking works is part of a big industrial complex being built at Sztálinváros. Building of the town and factories began six years ago; population of the fast-growing town is now over 30,000.

At the factories adjoining the coking works ammonia, sulphates, tar, sulphur and pyridine will be produced from waste gases.

As well as the first block of coking works, completion is also announced of the coal-preparation and gas condenser units. Coal preparation and coking operations have been completely mechanised and no physical labour will be used in this part of the works.

Ten miles of conveyor belts are fitted in the plant. The 'flock' furnace consists of a row of 55 chambers, each capable of taking a charge of 15 tons of coal. More than 12,000 tons of firebricks went into their linings.

SHOWROOM FOR CHADDERTON



To meet the needs of the growing residential areas in the Chadderton district of Oldham the North Western Gas Board has opened a new gas service centre in Middleton Road. An opening ceremony was performed by the Chairman of Chadderton U.D.C. The décor of the new premises is in modern style. On the ground floor all appliances are 'alive.' On the upper floor there is a further display section.

FULHAM GASWORKS EXPLOSION

Two Men Hurt

TWO men were slightly injured on August 8 when fire broke out as the result of an explosion in a retort house at Fulham gasworks in Imperial Road, S.W. Four men were working in the building when the explosion occurred. The two who were injured were taken to St. Stephen's Hospital, Chelsea.

The fire was first noticed by an employee working on the top of a 100-ft. lading tower. He raised the alarm and six fire appliances attended the blaze, which was brought under control in one hour.

A 36-in. gas main on the grid system enters the retort house, from which gas is boosted to the surrounding locality. A fire service officer said that his men helped workers at the plant to turn off the mains supply so that the fire could be tackled from inside the building. The main wall at one end of the retort house was badly cracked where the lighted gas had burnt most fiercely.

Mobile Showroom Destroyed

WASHING machines, refrigerators, cookers, water heaters, and boilers were among the articles destroyed when fire broke out in a garage at the rear of Uddingston gasworks. Preliminary estimates assessed the damage at over £4,000.

Firemen had to use breathing apparatus when forcing their way into the building, which contained 17 vehicles. The flames gutted a mobile showroom containing goods worth about £750. Two lorries and a lightweight van also were destroyed. The premises and several other vehicles suffered superficial damage.

'CHAMPION COOK' COMPETITION

A national cookery competition (strangely enough, this is nothing to do with the Gas Council) is to be held by the journal *Farmer and Stockbreeder* in conjunction with the National Poultry Show. Britain's 'champion country cook' is to be found from among women who 'live on or by the land.'

Closing date for the preliminary contests is September 12; twelve finalists will be invited to London for the championship at the National Poultry Show, Olympia, December 5-7.

Details are in the *Farmer and Stockbreeder* or can be obtained from Dorset House, Stamford Street, London, S.E.1.

First All-electric Public Laundry

THOSE whose business is concerned with seeing that gas stakes its claim in the laundry load will be concerned to learn of the opening, in Holland Street, Salford, of what is thought to be the first all-electric public washhouse in Europe. Almost all the steam and hot water required to operate its batteries of washing, drying, and ironing machines is obtained by the use overnight of off-peak electricity to heat water in two 12,000-gal. capacity steel storage tanks; the installation was designed by a Manchester firm in consultation with the North Western Electricity Board, and the total cost of the structure and equipment was £30,000.

International Horizons

PURCHASING OFFICERS' CONFERENCE

EVENTS in the Middle East may add some colour to the Purchasing Officers' Association conference at Scarborough from September 27 to 30.

Following the A.G.M., headed by President Mr. H. W. King, Mr. Stewart F. Heinritz is to talk on 'International Horizons for Purchasing,' in which he will 'no doubt have some important observations to make on the international pattern of world supplies.'

The Association also says: 'The steel situation and its increased importance in the future if, as seems possible at the moment, intensive shipbuilding activity may result from the present Suez Canal argument, will add to the interest of an address by Mr. E. W. Senior, Commercial Director of the British Iron and Steel Federation.'

Sectional meetings of the conference include one on oil, in which the effects of the oil supply situation on transport will be analysed.

In conjunction with the conference will be a goods display exhibition.

MINISTER'S RUSSIAN VISIT POSTPONED

Mr. Aubrey Jones, Minister of Fuel and Power, has postponed his visit to Russia, which had been planned from August 12 to 25.

The Ministry has stated that he hopes to make the visit at a later date. A spokesman of the Ministry said that as the Minister responsible for oil supplies Mr. Jones felt unable to leave London in the present circumstances.

The visit was arranged in response to an invitation from Mr. Malenkov, the Soviet Minister of Power Stations. Mr. Jones intended to spend the two weeks in inspecting developments in the fuel and power industries of the Soviet Union.

Open Meeting to Tackle Corrosion Problems

An open meeting dealing with the subject of corrosion has been organised by the Iron and Steel Institute, in arrangement with the British Iron and Steel Research Association. Members of the Institution of Gas Engineers are invited to this meeting, which takes place on October 12.

Members wishing to attend should write to the Secretary of the Iron and Steel Institute at 4, Grosvenor Gardens, London, S.W.1 (where, incidentally, the meeting will be held).

A.G.A. FORECASTS RECORD SPENDING

Companies Invest in Natural Gas

THE American Gas Association reports that construction outlays by the natural gas pipeline companies and the big gas utilities in the four years from 1956 to 1959 inclusive are expected to come to some $7,300 mill., which would be a record for any four-year period in the history of the industry. The association qualifies its forecast by pinning it to an assumption that present levels of economic and business activity will be maintained during the period. Also assumed is a continuation of a trend towards gradual inflation.

In 1956, according to the same source, natural gas expenditures for new construction and additions to present facilities will amount to some $1,550 mill. In 1955, actual outlays came to some $1,270 mill.

Although the forecast both for this year and the four-year period cover all phases of the gas industry, about 96% of the estimated outlays between now and 1959 will be spent on U.S. natural gas systems. Some $3,000 mill. over the four years will go to expand pipelines and other transmission systems.

Distribution facilities will require outlays of some $2,500 mill. The rate of expansion will be necessary, the survey reports, to keep pace with an addition of about 1 mill. per annum to the total of customers for gas.

Factors behind the growth of the industry include new housing construction, population growth and the continuation of shortages of gas supply in some areas of the country. A survey of a cross-section of all gas utility and pipeline companies reveals that 35% expect to finance new construction from internal sources, 48% will incur new debt, and the remaining 7% will issue equity securities.

HOME SECRETARY AT ROYAL WELSH SHOW

Major Gwilym Lloyd George, Home Secretary, visited the Royal Welsh Agricultural Show recently and here he is pictured with Mr. O. P. Cronshaw, North Wales Grid Manager, and Mr. H. Blythe, Colwyn Bay, inspecting the exhibits at the Gas Pavilion.

NEWS IN BRIEF

The Third International Automation Exposition is to be held in New York on November 26-30. Three conferences are to take place in conjunction with the Exposition: Their purpose is to give 'top-level administrative, engineering and research executives, or their representatives, useful information to help guide them in making decisions.'

Economy Measure.—The Southern Gas Board is to close its showrooms at Hartley Wintney and at Fleet, both in Hampshire. In their place a mobile display vehicle will visit each district once a week.

Leeds University athletic grounds, Lawnswood, were the scene of the North Eastern Gas Board's third annual sports and gala day towards the end of July. Present were some 3,000 Board employees and their families. Mrs. G. E. Currier presented the prizes.

Award for many years' voluntary work as collector of savings from employees of Geo. Wilson Gas Meters, Ltd., of which he is a director, was conferred on Mr. F. C. Wilson at the annual meeting of Coventry National Savings Committee recently.

COAL HAULAGE: ROAD VERSUS RAIL

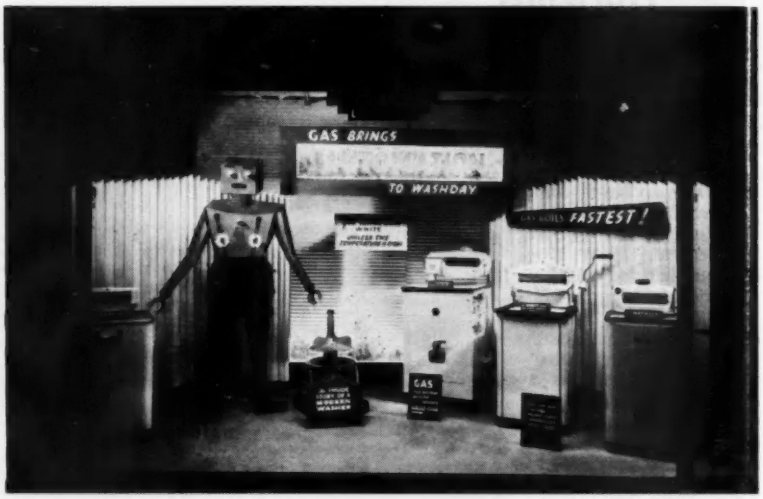
RESULTS WORRY C.E.A.

ACCORDING to the *Financial Times*, operational research now being carried out by the Central Electricity Authority is 'yielding some rather embarrassing results.' While the C.E.A. is producing electricity at the cheapest possible rate, the operational research team is reducing costs by carrying coal by road instead of by rail.

This could be a blow to the railways because hauling fuel to the power stations yields a substantial income. The matter is being discussed between the C.E.A. and the Transport Commission.

During the present coal shortage the N.C.B. decides what coal is available to each power station and where it is to be got. As it is often impossible to get coal from the nearest pit the task is a difficult one, and complicated still further by the choice of transport. In many instances canals have fallen into disrepair while 'track maintenance on the railway is a recurrent problem.' Here and there the tonnage which can be carried on roads is limited by the authorities.

The operational research team took all these factors into consideration and came to the conclusion that, although on an unchanged N.C.B. programme, in theory, it would be possible to save £1,400 per week, in practice the amount saved was only £350 per week.



'Automation' is the key word in this window display by the Tyneside Division of the Northern Gas Board. The robot's eyes have a flashing device.

FORMER DISTRICT MANAGER SENT TO PRISON

Notebook Found in Cooker

GEORGE T. DUNCAN, 7, Cloichard Place, Pitlochry, former Manager of the Pitlochry District, Scottish Gas Board, was sent to prison for 30 days at Perth Sheriff Court on August 13. He admitted stealing £21 19s. 3d., money paid to him in respect of the sale of coke, which he appropriated for his own use.

The Deputy Fiscal said that an auditor found the books in order. By chance he opened the door of a cooker, and found a notebook containing details of the coke transactions.

An agent said that Duncan kept a note of the sales so that he could repay the money. His wife had been unwell for years and had got into difficulties with her housekeeping.

Ireland

Advice Sought on Relative Efficiency

AN English expert on street lighting is to be sent to Belfast to advise on the relative efficiency and cost of gas and electric illumination of the main thoroughfares in the city.

It is understood that the Corporation Police Committee, which is responsible for street lighting, is to invite an independent expert to solve the Belfast problem because of reluctance to ask the chiefs of the gas or electricity undertakings, both of whom are directly responsible to the Corporation.

A proposal that electricity should supersede gas in all the main streets has been raised at meetings of the Police Committee and the Electricity Committee, when it was stressed that electricity was the cheaper form of lighting.

Another point put forward by those in favour of electricity is that many surrounding urban districts are more efficiently illuminated by fluorescent lamps than many of the city streets, which are still lighted by gas.

Strabane: £43 Profit

The report of the auditor on the gas undertaking for the year ended April 30, 1956, received by Strabane (Co. Tyrone) Urban Council, states that there was a profit for the year of £1,141, and after providing for interest on loans and depreciation reserve the net profit for the year's working was £43.

Coleraine (Co. Londonderry) Borough Council has passed a resolution authorising the Town Clerk to take all steps necessary to obtain authority from the Ministry of Commerce to increase from 10s. to 20s. or such lesser sum, the maximum estimated price for 1,000 cu.ft. of gas supplied by the Council's gas undertaking.

Healthful Hints

Readers may care to pass the following advice on to their workmen. It was first published in 'The Builder' in 1856.

HINTS TO WORKMEN FOR THE PRESERVATION OF HEALTH.

Abstain from all spirits and dram drinking. Spirits relax the muscles, diminish the strength of the body, and render men susceptible of disease. When mild-brewed beer agrees, keep to it as a beverage (*at your meals only*). Make daily ablution *the first thing on rising*: you will feel stronger and more refreshed for it during the day. Never quack or tamper with your constitution by taking patent medicines, they are offered for every kind of disease, for many of which they are decidedly prejudicial, producing very often fatal results. Never learn to smoke: shun tobacco in all its forms. It stunts the growth . . . it is a great promoter of indolence and laziness and it causes nervous trembling of the hands. The moral and physical effects upon those who use it are of a very dubious character.

Association Technique de l'Industrie du Gaz en France

—Annual Meeting

THE 73rd Congress of the Gas Industry in France was held from July 3 to 7 in the great hall of the Centre Marcellin-Berthelot in Paris. It is reported in the July issue of the *Journal des Usines à Gaz* from where we have abstracted the following notes.

More than 700 persons accepted the invitation of the Association Technique de l'Industrie du Gaz en France and 37 communications were presented and discussed under the chairmanship of M. Georges Nérot, President of the Association; of these 15 emanated from the Direction of Research and New Techniques of Gaz de France or were prepared under its patronage. Among the subjects covered at the meeting were: Gas analysis, the cracking of hydrocarbons, detarring of gas, the determination of the thickness of gasholder plates and those of steel mains, bacterial pollution in gasholders, electronic calculation of distribution networks, the interchangeability of gases, high temperature radiant heating, the use of gas in the porcelain industry, methods of tests of benzoic hydrocarbons, the preparation of pitch for the covering of steel tubes.

Questions of the Moment

On the suggestion of M. le Guellec, President of the Council of Administration of Gaz de France, several communications were directed to questions of the moment, so that considerable debate was devoted, on the one hand, to the conditioning of distributed gas, and on the other, to rubber joints for gas mains. On the latter point the communication of M. A. Bolzinger constitutes a veritable revision of hitherto more or less accepted notions and particularly relating to the flexibility which has been considered necessary in these joints and certain lacunæ in the theory of the absorption of benzole by the rubber.

In subsequent issues of the 'JOURNAL' we shall be presenting abstracts of those of the papers which we think will be of interest to British gas engineers.

The proceedings opened as an extraordinary general meeting at which certain modifications of the statutes of the Association were approved. Mainly these were directed to the admission to membership of engineers and technicians engaged in allied industries 'producing gases susceptible of being utilised directly or indirectly for public distribution, and particularly the petroleum industry.'

At the opening of the ordinary meeting, the President welcomed the representatives of 14 nations among whom was Sir Henry Jones, President of the Institution of Gas Engineers.

The presidents of the several commissions—plant construction, transmission and distribution, coke, tar, benzole and derivatives, education and information—presented their reports. The last named has continued its work towards the preparation of the multilingual dictionary of the International Gas Union. The International Commission which is to meet in London in the autumn will have to take a decision on the presentation of this work.

The Congress was addressed by M. Le Guellec, President of the Council of Administration of Gaz de France. After some remarks on his personal relations with the Association and its work in the service of the industry, M. Le Guellec began a brief survey of the first ten years of the Service National, the substance of which we have already published. The Service National, he said, had justified their most sanguine hopes. From over 2,000 mill. cu. m. in 1946, gas sales had passed 3,000 mill. in 1955. Industrial appliances installed had increased by 92% since 1947, domestic appliances had increased to a comparable extent. But there were difficulties. The insufficience of their coal resources compelled them to use imported coal to the extent of 30%. Increase of costs from this cause was heavy. The recent return to the scale of charges of 1952 authorised by the Government to adjust the price of coke relative to the cost of coal had not sufficed to restore the equilibrium, while the blocking of the sliding scale for gas prices prevented receipts from following the development of sales. But Gaz de France had recently been given the assurance that the diminution in receipts would be compensated by the State.

M. Le Guellec went on to outline the evolution of their establishment in the realisation of numerous projects. The underground storage at Beynes in the Paris Region of a capacity of 340 mill. cu. m. (12,000 mill. cu.ft.), of which 150 mill. cu. m. (5,300 mill. cu.ft.) would be utilisable, will permit the works of the regions to be operated all the year round at the most economic rate. Inter-connection of distribution systems will eventually cover the whole country. The residual gases of the oil refineries are playing a larger part in the gas economy. The natural gases of Lacq, estimated to have reserves of at least 100,000 mill. cu. m. represent over about 30 years the equivalent of 4 mill. tons of coal or about 5% of the national consumption of thermal energy. At the end of 1961 it was anticipated that, in this south west region, the production of crude gas would rise to 10 mill. cu. m. per day or some 6 to 10 mill. (265 mill. cu. ft.) of purified gas. Negotiations have resulted in an agreement between the producers and Gaz de France, and the foundation of the National Company of the Gases of the South-West; 30% of the capital of which will be held by Gaz de France and the remainder equally by the Sté. Nationale des Pétroles d'Aquitaine and la Regie Autonome des Pétroles. Similar agreements cover the transport and distribution of these gases.

New Coking Plants

In the Parisian Region, supplies already stepped up by the arterial main from the east will be completed by the eventual addition of residual gases from the refineries of Normandy. Further, there was another plan to be taken into account; in order to assist the steel industry to carry out by 1965 a programme for the production annually of 18 mill. tons of steel it was proposed to install new coking plants either in Lorraine or in other regions situated to the north of the Loire.

These and other developments led to the first steps in 1952 to the provision of some 4,000 mill. cu. m. of gas at 4 thermies (140,000 mill. cu.ft. at 420 B.Th.U. per cu.ft.).

It was estimated that sales in 1965 would be in the region of 5,000 mill. Their industry must prepare for the future in alliance with the national fuel policy, which itself must have regard to the world situation. Atomic energy to the extent of 2% of national requirements in 1965 might come to something significant in 20 or 30 years. Coal, raw material in short supply in their country, occupies the premier position for steel and electricity; it can be replaced by other forms of energy for a number of thermal and mechanical uses. It would be anti-economic to check the development of any form of energy, whatever it might be—each would respond to some demand—they had been able to sustain the claims of gas during this short decade.

A large number of those attending the Congress listened to a masterly address by M. Frances Perrin on 'Nuclear Energy and its Applications.' He gave a full survey of the fundamental principles of the subject and its present position—information which is already available in English. He concluded with some general reflections. Atomic energy presented, in countries like France and Britain where classic sources of natural energy were tending to short supply, the possibility to organise a desirable economic expansion without fear of lack of energy. It would come in ten, 15 or 20 years, according to the country. With regard to the raising of the standard of living thus rendered possible, M. Perrin thought that was a question not essentially technical. There remained all the problems, social, economic and political of the distribution of these riches. He expressed the hope that the development of atomic energy would be accomplished in harmony with such industries as the gas industry as were already in full expansion.

During the Congress visits were arranged to a number of gasmaking (mainly coke oven) plants and other industrial establishments. More than 300 members visited the laboratory at Landy of the Direction of Research and New Techniques of Gaz de France, where they were received by Messrs. Bolzinger

(Concluded on p. 472.)

Abstract of a Paper Presented at the Fifth World Power Conference at Vienna

Carbonisation in Great Britain with Special Reference to Coke Oven Plant

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TRENDS in carbonisation practice and associated research activities are influenced primarily by the availability of raw materials, markets for the products and the economics of production and utilisation. Despite the growing importance of the domestic use of solid smokeless fuels and the increased demand for gas, the predominating influence so far as the coking industry is concerned is still exerted by the iron and steel industry in its requirements for metallurgical coke for the production of pig iron in blast furnaces.

Types of Plant

It is not the intention of this present paper to enter into a detailed description of any particular type of coke oven plant at present in use in Great Britain or to classify oven design. Such information is widely available in the technical literature published by the major coke oven constructional companies and has been summarised in the technical press. Study of the history of coal carbonisation practice shows that modern coke oven plants have evolved as a result of detailed development within the framework of a number of well defined major advances since the first production of coke in beehive ovens. The early by-product ovens first built in Great Britain towards the end of the nineteenth century incorporated the fundamental principles of indirect heating of the coal in a slot-type chamber using part of the gas produced on carbonisation, which are the basic features of modern coke ovens. They were, however, of the waste heat type, and had a number of disadvantages which were overcome by the introduction of the regenerative type of oven in the 1920's. The application of individual regenerators and underjet systems of heating, coupled with the introduction of silica refractories, eventually led to the high temperature coking process as now practised.

With greater demand for blast furnace coke and the gradual introduction of larger blast furnaces, more attention was paid to facilities for preparation of the coal charges and especially for the blending of coals to ensure uniformity of the coal charge.

These developments have led to features which are common to the majority of coke ovens now being built. There is a growing tendency towards compound ovens, i.e., capable of being underfired either with rich gas or by lean gas such as producer gas, blast furnace gas or various proportions of these fuels (see table 1). The modern oven is of the order of 13 ft. high in the chamber and some 54 ft. long and has a mean width of the order of 16 to 18 in. but these dimensions may vary to meet particular requirements at different plants.

TABLE I

Type and Number of Ovens in Operation in Great Britain in 1945 and 1954

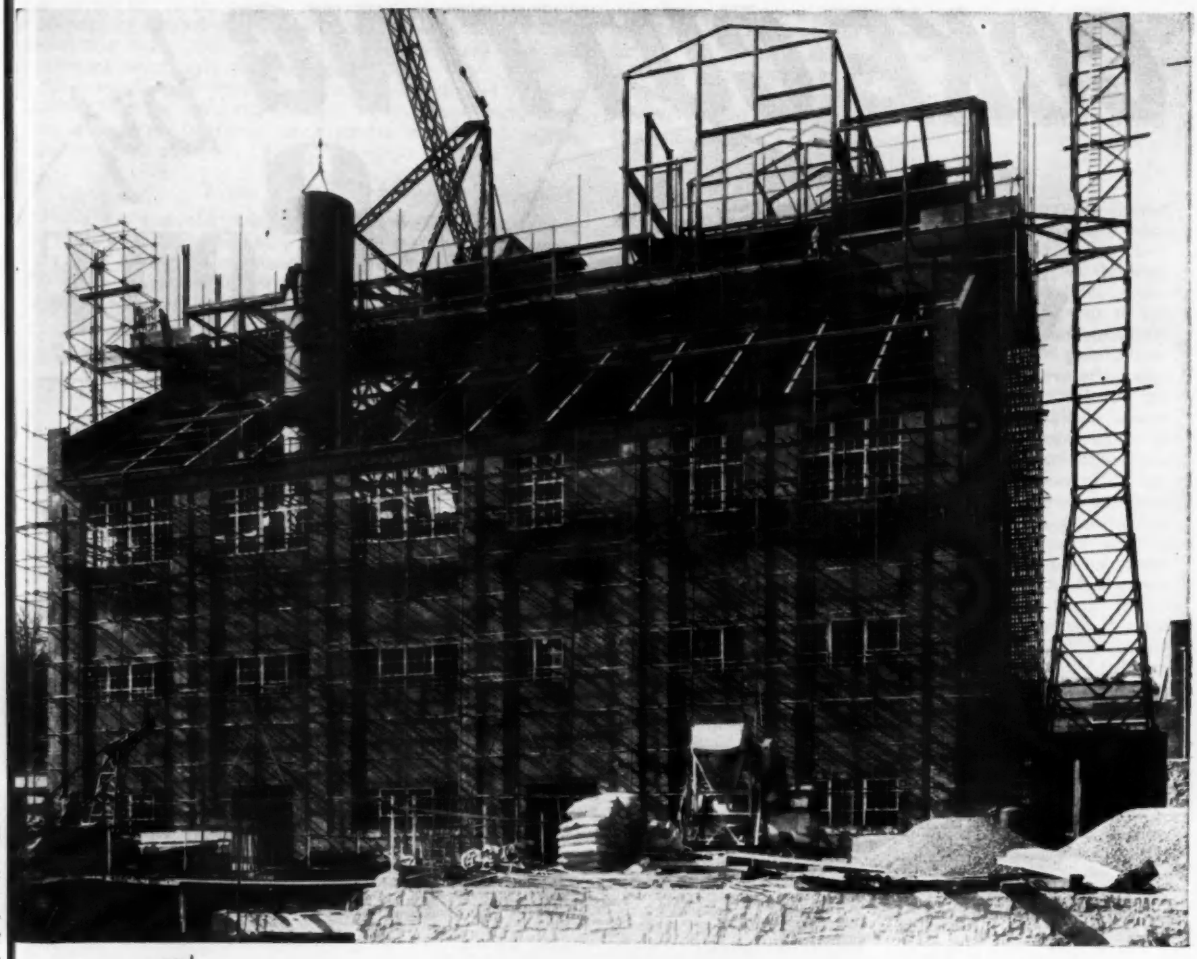
	Regenerative compound	Regenerative other than compound	Waste heat	Beehive	Totals
1945—					
Ovens in operation	1237	2569	1083	218	5107
Ovens available for heating but not in operation	31	79	34	125	269
Ovens rebuilding	14	222	37	5	278
New ovens under construction	68	126	—	—	194
1954—					
Ovens in operation	2188	1960	755	187	5090
Ovens available for heating but not in operation	42	—	—	—	42
Ovens rebuilding	62	51	15	4	132
New ovens under construction	388	66	—	—	454

Perhaps the major trend in the new construction which has been undertaken in Great Britain since the second world war is the concentration of ovens into larger units as a result of the dictates of economic conditions and the centralisation of the ownership of coking plants. As a broad subdivision, the coking plants in Great Britain, prior to nationalisation of the coal industry in 1947, were grouped as follows so far as ownership was concerned. There were twenty-three plants associated with the large iron and steel undertakings, fifty-three plants owned by or associated with colliery companies and ten independent or merchanting plants. The relative production of these groups in 1947 was approximately 44% at collieries, 44% at iron and steel works and 12% at independent plants. The iron and steel plants were on the whole of more recent construction than the remainder and those associated with collieries or independently operated were generally of smaller capacity. With the nationalisation of the coal industry in 1947 an opportunity came for greater application of capital for new construction and the tendency has been towards a gradual policy of centralisation at larger units of the order of 1,500 to 2,000 tons of coal capacity per day. A number of factors have been responsible, but amongst the more important are those of capital costs which have risen, for example, in the past two years by something of the order of 17% and the relationship between the prices of coking coals, coke and by-products and the cost of ancillary services.

In the iron and steel industry there has been a growing need for increased production to meet the demands of the blast furnaces. The coal industry's interest in coke ovens also derives in part from the demands of the iron and steel industry for metallurgical coke, but in addition is now increasingly influenced by the need to produce adequate quantities of domestic solid smokeless fuels.

Increased Mechanisation

In all this new construction every effort is being made to minimise underfiring requirements and to improve throughput. Increased mechanisation, coupled with the greater size of unit, is resulting in a reduction in the number of men employed per ton of coke produced. The annual output of coke per oven in 1947 was 2,800 tons. By 1953 this output had risen to 3,400 tons per annum and in 1954 to 3,500 tons per annum. Production per worker employed in the industry was some 940 tons in 1954 compared with 920 tons in 1953 and 860 tons in 1948. The modern coke oven plant requires comparatively few operators in relation to the capital cost of the equipment. For example, the total number of workers employed in the coke and by-products trade in Great Britain was 17,300 in 1948 and had only risen to 19,200 in 1954. For this reason there is little scope for improvement in productivity in the normally accepted sense and efforts in that direction are more likely to be achieved by maintaining or improving the quality of products using inferior raw materials and by exten-



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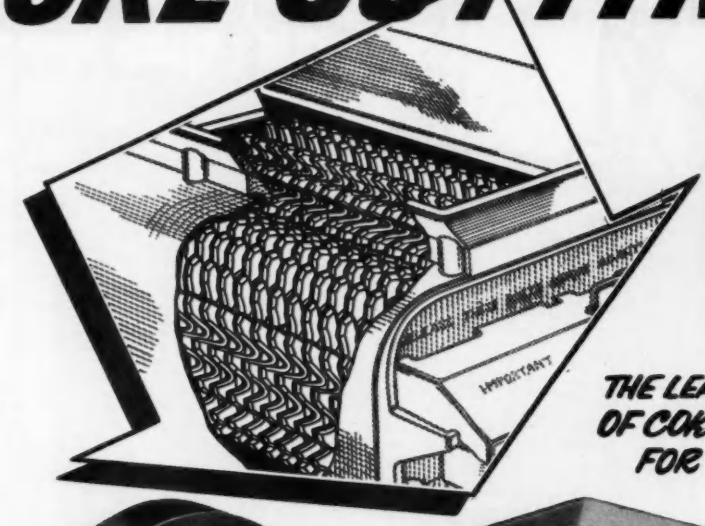

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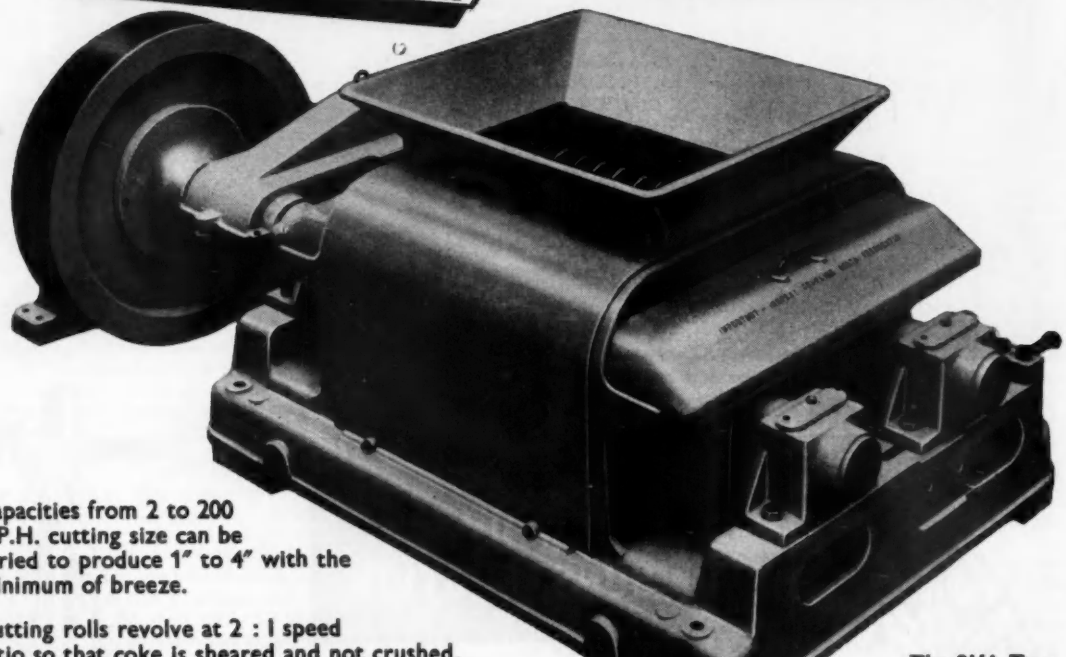

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sion of the life of the ovens. It can be claimed that research work already carried out has led to an extended life for coke ovens now being built and operated, as compared with the equipment which they are replacing.

All new coking plants are being equipped with coal blending facilities and the basic requirements of such equipment have been postulated following an extensive survey of plants throughout the country.

Types of Fuel Used

Using the accepted classification as a means of describing the coals available it has been estimated that in Great Britain the coking coals reserves intended to be worked during the next 100 years in seams of not less than 2 ft. thickness and at depths not greater than 4,000 ft. are as follows:

TABLE II

Estimated Reserves of Various Types of Coal to be Developed in the Period 1942-2042

Coal Rank Code No.	Developed reserves million tons	Percentage of total developed reserves
301 and 401*a*	1,556.2	7.6
400, 500 and 600	7,402.3	36.1
700	2,894.4	14.1

The remaining percentages of reserves estimated as likely to be mined in this 100 years period are high-volatile, very weakly caking or non-caking coals (27.5%) and the anthracite and steam coals (14.7%). Only the 301 and 401a groups contain purely coking coals of medium volatile content and they represent 7.6% of the developed reserves. The best metallurgical and foundry cokes are produced from the 301 coal obtained mainly in the Durham and South Wales coalfields. The remaining groups (400, 500 and 600:700) represent coals carbonised either at gasworks or in coke ovens but these are much less desirable for providing coke of suitable quality for metallurgical purposes.

It is apparent that there is a potential shortage of good coking coals—a matter which is obviously of growing concern to the large and well-established coking industry. Thus two important basic factors must be considered if the continued development of the industry is to be safeguarded, namely, the conservation of existing reserves and the satisfactory utilisation of the inferior qualities of caking-coal when the better rank reserves are exhausted.

This position was surveyed in 1955 by E. H. Browne in a comprehensive paper on the coalfields of Great Britain and their future development, in which it was indicated that the demand for carbonisation coals would be expected to increase but that the main reserves—in the East and West Midlands, East Yorkshire and certain areas of Scotland—were largely low rank coals (types 700-900) and not therefore attractive for carbonisation. In addition to the question of rank, the ash and sulphur contents of the coal are of great significance for carbonisation and it is the presence of these impurities which also limits availability of carbonisation coals. The paper concluded 'that true coking coals must be eked out by the maximum use of lower rank coals of which there will be substantial tonnages of suitable ash and sulphur content. This means that these coals will have to be reserved for the purpose for which they are specially suitable and the qualitative advantages of carbonisation coals must in the future—in contrast to the past—predominate over geographical advantage.'

Another paper presented to this conference deals with the methods at present being studied and developed for the thermal treatment of coal and stresses the significance of such treatment particularly with a view to producing solid smokeless fuels for domestic use. From the standpoint of coke oven plant operation, the main and immediate concern is how best to utilise in existing coke ovens the less strongly caking coals which will have to be used in increasing quantities and still maintain coke quality at a level acceptable to the principal consumers. Growing attention is therefore being paid to the question of charge preparation by bulk density control, oil addition, petrographic separation and the possible admixture of various additives such as pitch or chemicals. Results of oiling of coal charges at a large industrial plant over a year showed that the addition of 0.35 gal. of oil per ton of coal charges gave an increased throughput of 4%—an increase of some 10,000 tons of coke per annum. The quantity of oil was subsequently raised to 0.5 gal. per ton giving an increased throughput of 5%. Reference may also be made to a systematic series of tests being carried out in the B.C.R.A. movable wall test oven on the influence of variation of moisture content of the charge, oil additions, size and type of coal. One of the main objectives of this work is to assess the factors influencing the bulk density of oven charges.

Products and their Disposal

The products of carbonisation in coke ovens may be divided conveniently into five groups: blast furnace coke, foundry coke, domestic coke, gas and liquid by-products.

The importance now attached in Great Britain to the need for the elimination of atmospheric pollution and the establishment of smokeless zones has given added impetus to the development of solid smokeless fuels. The recommendations of the Committee on Air Pollution and other publications relating to this subject stress the need for increased availability of such fuels and in this respect the coking industry has an important part to play in the years immediately ahead. The significance of size characteristics applies particularly in the domestic use of coke. This has received attention, and test sieving apparatus capable of readily giving a measure of size and the efficiency of the coke oven screening plant has been developed, accepted by the coking industry and incorporated in a British Standard. The domestic utilisation of oven coke in Great Britain falls into two broad categories—use in closed appliances and in the modern type of open grate. For closed appliances normal oven coke suitably sized and closely graded may be regarded as a very satisfactory fuel. For use in open fires a limited production of fairly reactive oven coke is already available but increasing attention must be paid by the industry to such characteristics as bulk density, reactivity, ash content, ash fusion temperature and maintenance of low sulphur content if a more widely acceptable open fire fuel is to form a growing part of the market for oven coke. Here again the tendency must be towards increased attention to blending and charge preparation for specific characteristics in the coke produced.

The coke ovens continue to hold an increasingly important position in regard to national gas supplies and 71,709 mill. cu.ft. were supplied in 1954 to gas undertakings, a figure representing about 14% of the total gas made by the area gas boards. Comparable figures for earlier years are:

1930 — 13,202 mill. cu.ft.
1945 — 51,359 mill. cu.ft.
1950 — 62,205 mill. cu.ft.

During 1954 the total make of coke oven gas was approximately 290,000 mill. cu.ft. of which 122,000 mill. cu.ft. were used on coking plants and 78,000 mill. cu.ft. in iron and steel works.

Special Problems

The satisfactory disposal or treatment of coke oven effluents is a matter of increasing concern. Under the powers conferred by recent legislation the River Boards will be in a position to demand stringent control of the quality of effluent discharged into rivers and streams. In view of the high toxicity and appreciable volume of waste discharged from coke ovens, effluent treatment is a subject for urgent study. The two main approaches being employed to alleviate the difficulties are chemical treatment and biological methods. A number of chemical processes have been put into operation, for example, the Corby effluent treatment process (Permutit—Stewart & Lloyds—Woodall-Duckham system). Biological treatment units have been erected at a coke oven plant in South Wales where satisfactory performance is claimed under the specific conditions encountered. Two aspects of this subject are of special significance; the specific requirements of the River Boards and the capital and operational costs of effluent treatment plant. The problems of treating coke oven effluents are of course similar in some respects to those encountered in the gas industry. It should however be emphasised that coke ovens present special difficulties due, for example, to the location of large centralised installations away from towns or large centres of population. The purification of waste waters and waste gases is the subject of separate papers from the British National Committee.

The cooling of coke is another special problem which will probably require further examination not only from the point

of view of reduction of atmospheric pollution but because of the obvious technical desirability of conservation of heat and consequent improvement in the overall thermal efficiency of carbonisation in coke ovens. With the exception of thermal insulation to prevent radiation losses from a battery, the recovery of the sensible heat of the coke offers the only major scope for improving thermal efficiency on coke ovens.

New Systems of Carbonisation

The foregoing sections indicate some of the problems facing the coking industry and the broad lines upon which they are being examined. One alternative possibility is to adopt some entirely different system of carbonisation instead of the slot-type of oven.

The coke oven process is a relatively simple operation which consists of carbonising coal in batches in a slot-type of oven and recovering the products. The coal is treated before carbonisation and the coke discharged is subjected to screening processes, but the important fact is that the operation as a whole is essentially a one-stage process involving a minimum of plant and labour. The introduction of intermediate or consequent stages to the process would involve extra capital operating charges. Whether these can be afforded or not depends upon the economic position and the demand for products of a particular type. Generally speaking, however, multi-stage carbonisation processes have never shown commercial progress because of this fact, and this consideration is of importance in assessing the potential value of new processes for the thermal treatment of coal. Many alternative systems have been proposed and developed and in 1953 an O.E.E.C. sub-committee presented a report based on a survey of processes for the carbonisation of coal in plant other than coke ovens. This report covered not only established processes such as the successful Phurnacite process but also methods still in the development stage. The majority of these processes are now well known and have been reported and discussed in technical circles.

In his paper to this present Conference Dr. Idris Jones has described important research and development of the National Coal Board in the sphere of thermal treatment of coal. The research has been concerned not only with extension of the range of coals suitable for the Phurnacite process by mild pre-oxidation of caking steam coals and fluidised devolatilisation of low rank coals but also with fundamental studies of fluidity of coal and examination of plastic behaviour. The suggestion has also been made that the processes which have been evolved and are still being developed through the pilot scale for the manufacture of uniformly-sized smokeless fuels from low rank coals for domestic use, are probably applicable to the production of foundry and blast furnace fuels. Processes for the manufacture of binderless briquettes are being investigated in this context. Such processes have the same purpose in view —the utilisation of the coals which are likely to be available in the future as the lower rank coals replace the diminishing reserves of the best carbonisation coals.

Trends in Carbonisation Research

Carbonisation research by the coking industry in Great Britain may conveniently be divided under the headings of fundamental long-term research and work of a more practical nature, devoted to solving the problems and increasing the efficiency of the industry in the years immediately ahead. Work in the second category is often associated with large-scale development. Transition from the laboratory scale to successful commercial practice carries with it special difficulties frequently involving the provision of full-scale facilities for confirmatory work, capital on a scale normally outside the orbit of the research organisation and consequent delays.

The fundamental research problems facing the coking industry in Great Britain may be stated quite simply. They are to obtain an increasing knowledge of the mechanism of carbonisation and of coke formation so that the properties of the materials concerned and the systems used can be adjusted to the best all-round advantage. These problems are being attacked in many laboratories in different ways and on different scales ranging from the use of the electron microscope and X-ray techniques developed in the Northern Coke Research Laboratories in Newcastle to the recent proposals of the British Coke Research Association to erect full-scale coking plant capable of emulating industrial practice.

The industry must continue to provide good quality metallurgical coke in the future with a reduced availability of the better qualities of raw materials and at a time when the economics of coke production are becoming increasingly difficult. Furthermore, there is a growing need to produce a good solid smokeless fuel for domestic heating by carbonisation of coal in coke ovens. There appear to be in practice only two methods by which significant changes can be made at existing coke oven batteries, namely, by altering the characteristics of the raw material charged to the ovens and by adjustment of operating techniques. These factors give rise to the following objectives for the immediate research programmes of the coke oven industry:

(i) The need to develop and establish reliable practical and economic methods of producing good quality metallurgical coke ovens from medium or poor quality coking coals.

(ii) To devise similarly sound techniques for the manufacture of good quality solid smokeless fuels by the carbonisation of coal in coke ovens.

Other important research projects arise from these themes. They involve, for example, the conservation of reserves and the extension of the range of coals by blending or other means. Capital and operating costs within the industry are high and any extension in the life of ovens, reduction of operating and maintenance costs and improved working conditions will be of benefit to the industry and to those employed in it.

Disadvantage of Present System

The continuing use of the slot-type of oven does not mean that research devoted to the development of new processes of carbonisation should not be pushed forward. The present system suffers from the disadvantage that it is not a continuous process and that, efficient though it may be, no means has yet been universally adopted of recovering the relatively large amount of energy lost as heat in the discharge of coke. This is a weakness which new design may overcome, but it is important to consider capital costs and the economics of operation. Attention is continually being given to the development of more rapid and efficient heating of the charge although this work has been almost entirely on conventional lines. Experiments have been undertaken to raise the whole of the charge to the required temperature at a uniform rate by dielectric heating methods thereby avoiding the temperature gradient in the conventional process. Work on these lines is still in the early laboratory stages. How far the development of atomic energy could influence the manufacture of iron remains to be seen, but it is difficult to envisage the reduction process being satisfactorily accomplished by any other medium than coke, such as, for example, the use of hydrogen, in present industrial practice.

It is apparent, therefore, that the main problems now facing the coking industry require examination on the practical scale but it is also of the utmost importance that the research programmes should provide for progressive development of the carbonisation process and for this reason care is being taken to establish an appropriate balance between technological and fundamental research. Fundamental studies now in progress and planned for the future are directed towards a better understanding of the mechanism of carbonisation and the coking process, to investigation of the reactivity of carbon and to a more complete knowledge of the constitution of coke and the fundamental character of coking coals.

In view of the time taken to carry out work on blending or other forms of charge preparation on a large scale, laboratory scale tests are being carried out on small charges of the order of 10 lb. of coal and extensive investigations have been carried out on the 5 cwt. scale oven. These steps will facilitate the preparation of the most economical designs of experiments for large-scale work and as hypotheses emerge from fundamental studies and through the medium of laboratory and semi-scale research work, it is hoped to establish a sound theoretical or fundamental basis for blending which will eventually supersede the empirical approach used at present.

Work on the physical properties of coke has followed two main lines: a more precise specification of the size of irregular particles and particularly of coke, and a study of the breakage of coke in an attempt to understand the process and ultimately to reassess the shatter test which is widely used in Great Britain as a measure of the strength of coke. The size of coke is controlled in commercial practice by a screening process which gives different coke grades. It was first of all neces-

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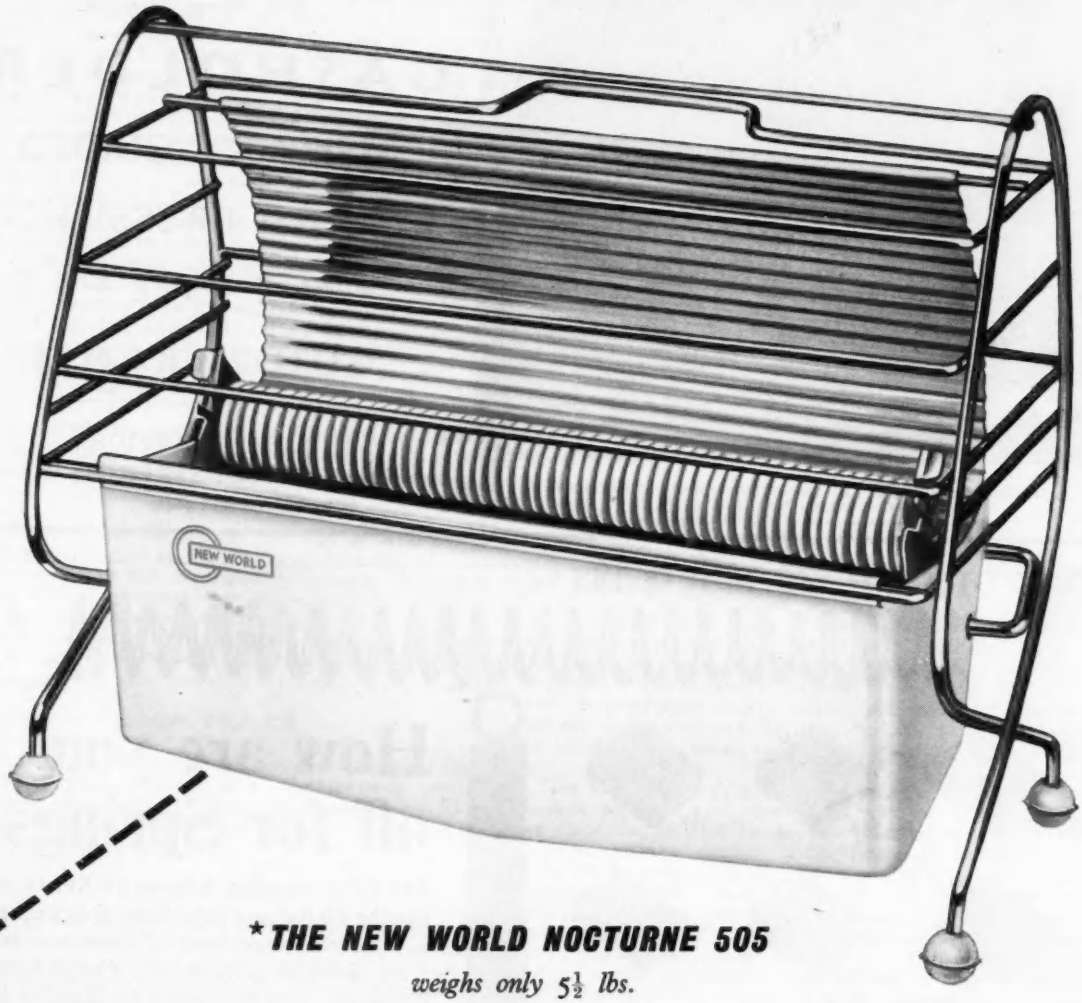

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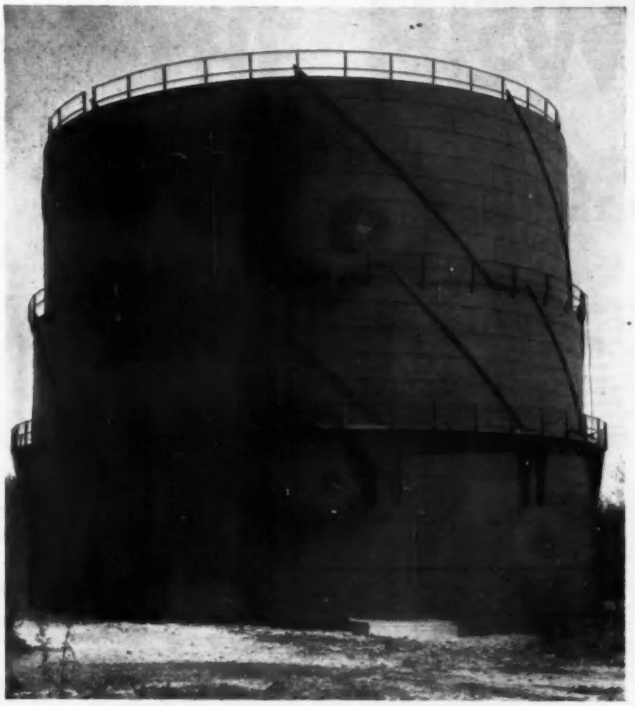

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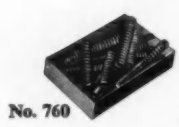

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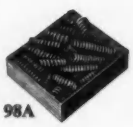

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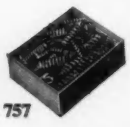

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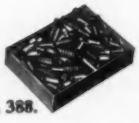

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sary to develop a laboratory test sieving process which could assess by a standard procedure the 'size' of coke grades produced by any commercial screening process. This has now been done and the B.C.R.A. Test Sieving Machine is in commercial production. Having secured a standard method of relating commercial screen sizes to laboratory test sieve sizes, the 'size' of narrowly graded fractions of coke has been studied. The method has been to determine the mean length, breadth and width of the particles and the relationship between these geometrical characteristics and the test sieve size has been studied. Certain ratios such as the flatness ratio, the prismatic ratio and the volume ratio have been found to be of value. Studies concerning the breakage of coke have resulted in important conclusions. One of the most outstanding results has been the recognition of the fact that once the primary fissures of coke have been virtually removed, the resistance of different cokes to further breakage varies but little and the differences between a physically 'good' coke and a 'poor' coke tend to disappear.

An illustration of the fundamental long-term research work carried out in the Northern Coke Research Laboratories in Newcastle is provided by the study of the chemistry of the reactions between carbon or carbonaceous surfaces and oxidising gases. It has become widely accepted that a significant part is played in the reactions by surface carbon-oxygen complexes which may persist up to relatively high reaction temperatures and which, when decomposed, yield oxides of carbon. There has, however, been no general agreement about the mechanism of the formation of the surface complex or 'surface-oxide' even in the chemically simple $C+CO_2 \rightleftharpoons 2CO$ or about the rôle of the surface oxide in the gasification process. The two objectives of the Association's work in this connection have been:

(a) To examine the mechanism of formation and thermal stability of the surface-oxides formed in the reaction and to determine the influence of the surface-oxide in the reaction;
and

(b) to examine the influence of structural or other characteristics of carbon on the kinetics of the reaction.

Experiments have also been made to examine the catalytic effects of mineral impurities upon the reaction.

The principal conclusion which has emerged is that in the reaction between CO_2, CO and mixtures of these gases with carbon at temperatures between about 600°C. and 950°C., two simultaneous rather than consecutive reactions are concerned, namely:

$CO_2 + C \rightleftharpoons$ surface oxide, $C(O) + CO$

and $CO_2 + C \rightleftharpoons 2CO$.

The kinetics of the reaction are influenced by retardation effects caused by blockage of reaction sites by surface-oxide; previous observations of retardation of the CO_2 C reaction caused by sorption of CO can be ascribed to secondary reaction of CO with surface-oxide to yield CO_2.

Catalytic Effects

The important catalytic effects of extremely small quantities of impurities in carbon have also been studied. The addition of small amounts of the order of 0.01% of sodium carbonate to carbons, which had been purified by chemical treatment and subsequent heating at 2,250°C. in high vacuum, increased the initial reaction rate of a carbon and CO_2 by a factor of several hundreds. Experiments are continuing to examine in greater detail the behaviour of pure carbon in the reaction and the influence of catalytically active elements.

The forward programmes of the British Coke Research Association are being devised to find practical solutions to the main problems mentioned in this paper, and in particular to take the practice of blending beyond the empirical approach at present used. As the work progresses, attention will be turned to plant problems such as insulation and improvement in operation techniques by more extensive use of automatic control. Consideration will be given to oven dimensions and to questions of maintenance. The possibility of more rapid heating and internal heating of the charge will be examined. The general subject of improved heat recovery and coke cooling methods will also be borne in mind. The work of charge preparation will include admixtures of various materials with the coal, blending, control of petrographic constituents, briquetting and in general the preparation of shaped charges. During the past few years fundamental studies, as indicated earlier, have been devoted to the better understanding of the theory underlying the heat treatment of coal and this work will be intensified.

The best method of carrying out investigations on an industrial scale has been the subject of much discussion in the coking industry in Great Britain during the past few years and it has been concluded that the prior needs of production and the desirability of being in a position to take calculated risks with large-scale equipment exclude any extensive reliably planned work at an existing commercial plant. For this and other reasons the decision has been taken by the industry, with the support of the appropriate Government Department, to establish a full-scale test plant at which urgent practical problems can be examined. This establishment is being erected on a self-contained site adjacent to the most recently completed coking plant in Great Britain. The facilities provided include headquarters accommodation, research laboratories, large-scale testing facilities and general workshop laboratories for plant development. The research laboratories will comprise chemical, physical and fundamental studies laboratories and the general workshop facilities will house various small-scale test ovens and provide space for the development of new methods of carbonisation on the pilot scale. A large-scale oven will provide a means of carbonising coal under conditions directly comparable with those existing at commercial plants and particular attention has been paid to the equipment to be included for coal blending and charge preparation. Facilities for development work in new processes of carbonisation have also been included. A simple but complete by-product plant is being incorporated in the full-scale facilities to enable yields to be assessed.

By these means it is hoped that added benefits will be derived from this close association of work throughout the whole range from laboratory fundamental studies to large-scale practical work on the same site.

STEEL DRUM RECONDITIONING

AN application of a gas process to the steel drum reconditioning industry is the subject of an article published in the *American Gas Journal* recently. Mr. Robert G. White, President of a manufacturing concern in New York, writes that two problems have always plagued this industry: Slow, inefficient methods of removing drum residues, plus the volume of uncontrollable smoke that resulted when they were burned out.

The following is an abstract of the article:

Both problems have been solved with the introduction of an automatic, gas-fired furnace that processes steel drums and barrels, and also disposes of the fumes and smoke arising from the burn-out. The first unit is now in operation at Gold Cooperage, Newark, New Jersey, and additional machines are under construction. Steel drums, lids and rings are placed on a conveyor that carries them automatically through controlled heat zones and beneath the built-in fume incinerator. In the combustion chamber, high pressure gas burners (maximum 3 mill. B.Th.U. input) ignite the combustible materials. Fumes and smoke are drawn up into the incinerator and are discharged into the atmosphere as clear, odourless gas.

In designing the furnace, the problem was one of combustion rather than mere heat input, inasmuch as most of the materials left in the drums were highly inflammable. Sufficient air had to be introduced into the furnace, and products of combustion exhausted at a fairly rapid rate to compensate for the amount of the various materials that remained—it is not uncommon for some drums to contain as much as 5 in. of materials, all of which must be removed.

The furnace handles 115 drums and lids per hour regardless of previous contents. Residues of oil, grease, chemicals, plastics, paints, solvents, etc., are burned out so effectively that only a fine, carbonised ash remains. As a result, final cleaning by means of shot blasting is speeded up and simplified.

By controlling the conveyor speed and input of gas, drums that are excessively coated can be given a longer burning cycle.

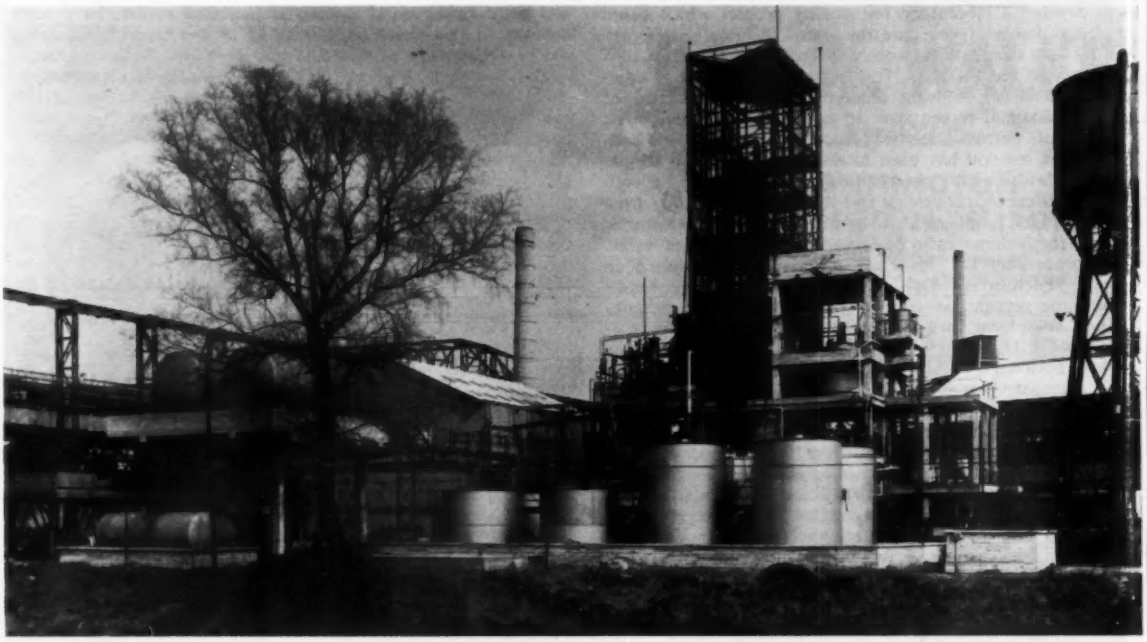

Fig. 1. A full-scale plant designed jointly by Union Chimique Belge and Chemical Engineering Wiltons, Ltd., and built by the former for Société des Forges de Clabecq at a coke oven plant at Vilvorde, near Brussels. The photograph shows the pipestill building on the left with product storage tanks in the foreground.

CONTINUOUS BENZOLE RECOVERY AND RECTIFICATION

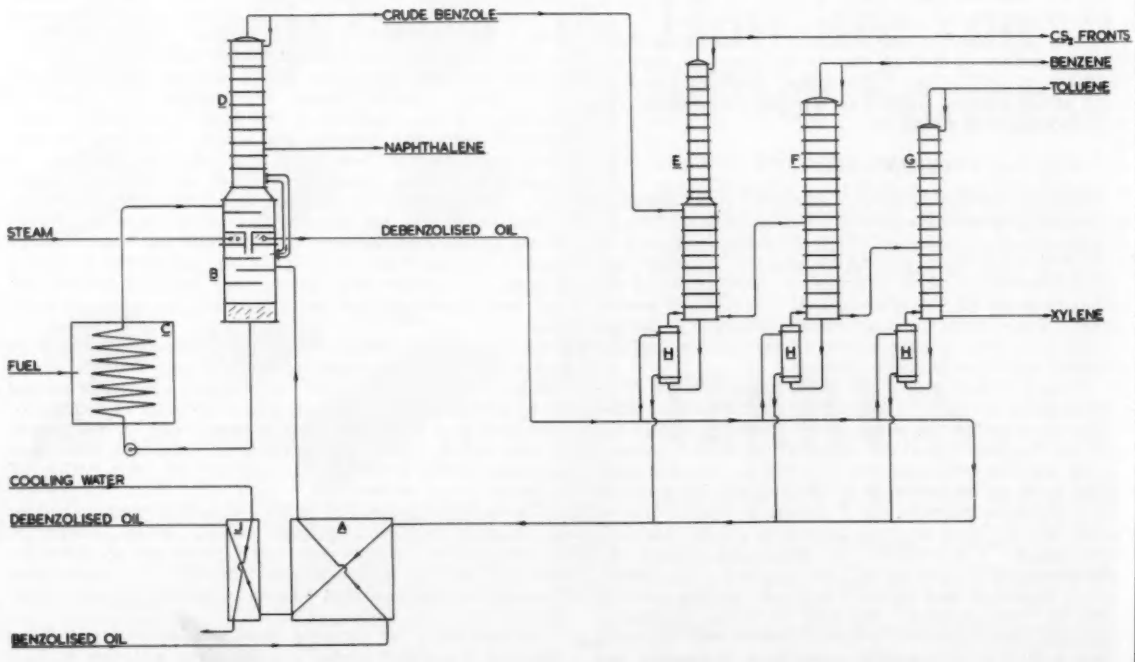

Fig. 2. Basic flow diagram of UCB-Wilton pipestill process.

CHEMICAL Engineering Wiltons Ltd., in collaboration with the Union Chimique Belge, of Belgium, have lately introduced a new type of continuous benzole recovery and rectification plant. In the past the recovery plant and the rectification plants were operated separately, the former being continuous and the latter being intermittent. Under those conditions, whereas the recovery of benzole on all coke oven plants was economically necessary, it was only at the larger plants that it was worthwhile rectifying the crude benzole. This was principally because the conventional processes needs a good deal of heat in the way of steam, often at high pressure and the heat used in stripping the benzolised wash oil is lost to condensing water and to the debenzolised oil coolers.

This new process, however, combines the two operations of stripping the oil for the crude benzole and rectifying the crude benzole so produced in one plant. The only heat supplied to the plant is to a Wilton pipestill which, incidentally, is not functioning as a still under these conditions but as a means of heating debenzolised oil which in turn transfers heat from the pipe still to the base of the stripping still where it meets the benzolised oil arriving from the benzole scrubber by way of an exchange heater. The benzolised oil is finally stripped by live steam as in normal practice, and instead of being passed through a cooler and returning to the scrubbers, it is passed to the base of three rectifying stills from which are distilled the sulphur impurities, benzene, and toluene and xylene respectively. The debenzolised oil then passes through a heat exchanger to a cooler and finally back to the scrubbers. For the process to work smoothly the volume of benzolised oil received from the benzole scrubbers must be replaced by an exactly similar volume of debenzolised oil being returned to the scrubbers from the rectification stills.

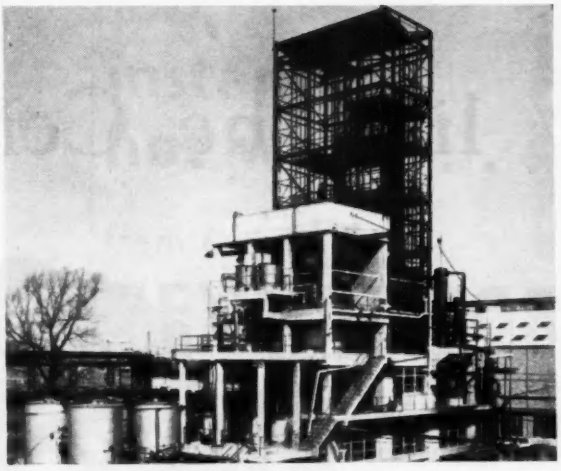

Fig. 3. Another general view of the plant seen in Fig. 1, showing the arrangement of the acid washing equipment. This plant has now been in successful operation for over two years.

The UCB-Wilton Process

Fig. 2 shows the flow of the benzolised oil from the scrubbers through the stripping plant. The benzolised oil first passes through heat exchangers A, where it is heated to about 125°C. by the debenzolised oil returning to the scrubbers, and then enters the lower part of the distillation column B. Here it is stripped of benzole by mixing with a stream of debenzolised oil maintained at 190°C. by continuous circulation through the pipestill C.

Substantially benzole-free oil at 150°C. is drawn from the base of the distillation column and pumped through the pipestill, from which it emerges at 190°C. This hot oil enters the upper part of the distillation column and cascades over trays into a steaming section, where any residual benzole is stripped out by steam pokers. The hot debenzolised oil then cascades over further trays in the lower section of the distillation column, where it mixes, as already described, with the incoming benzolised oil and releases the benzole. The released benzole passes up through the vapour pipe into the fractionating column D, joining the steam and residual benzole vapour released in the steaming section: it should be noted that all the benzole vapour and steam entering the fractionating

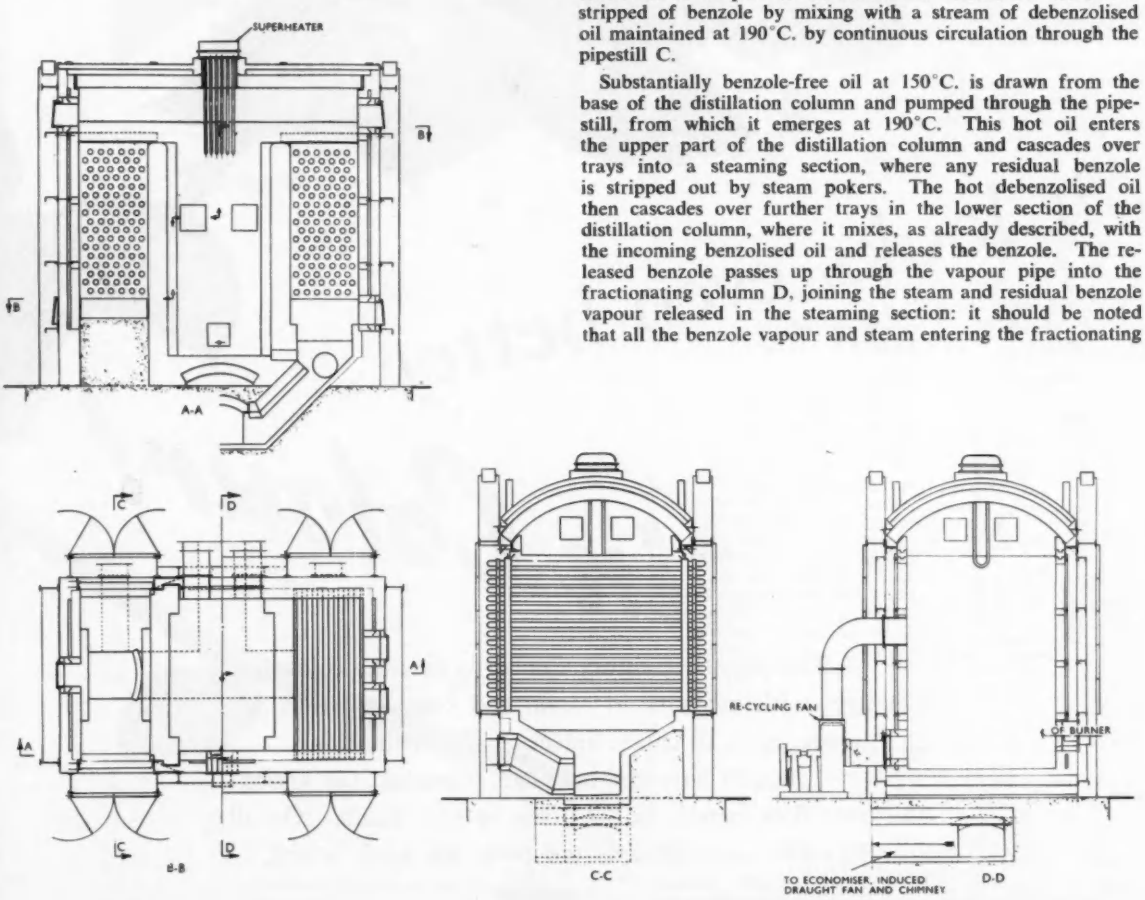

Fig. 4. The Wilton pipestill in detail.

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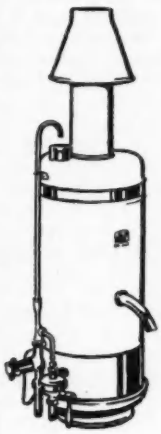

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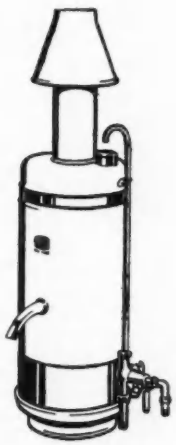
This heater has an output of 2½ gallons per minute raised 40°F. It is finished in white vitreous enamel with chromium-plated base and fittings. The Automatic Valve ensures that the gas is automatically cut off to the burner if the flow of water fails.

or I.C.

with interlocking gas and water cocks

The interlocking cocks prevent the gas being lighted before the water is turned on; it is equally impossible to turn off the water until the gas has been extinguished at the main burner. Output and finish as for the A.V. model (above).



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column must pass through curtains of hot cascading oil, which effectively remove any oil droplets that might otherwise escape into the fractionating column.

The fractionating column, which is equipped in the standard way with condenser, separator and reflux system, produces clean crude benzole for delivery to the rectification system. Since the quantity of heat supplied is greater than in the column of a conventional steam stripping plant, a sidestream of oil highly concentrated in naphthalene can be withdrawn. Residual wash oil is also effectively fractionated out and returned to the steaming section of the distillation column.

Benzole Rectification

The heat needed for rectification is derived from debenzolised oil, which is withdrawn at 190°C. from the steaming section of the distillation column and is pumped round a ring main feeding the fractionating columns E, F and G through three reboilers H. The partially cooled oil then passes through the heat exchangers A to preheat the incoming benzolised wash oil, after which it is finally cooled by water coolers J and returned to the benzole scrubbers. The rate at which the debenzolised oil is pumped round the ring main is equal to the rate at which benzolised oil is received from the scrubbers: the ring main circulation is in fact a bleed from the pipestill circulation, which takes place at a rate two or three times greater.

The debenzolised oil pumped round the ring main contains more than enough heat for complete benzole rectification. The crude benzole from the fractionating column may therefore be fed in series into the CS_2 topping column E, the benzene column F, and the toluene and xylene column G.

The numerous ways in which the rectifying columns may be operated depend on the nature and washing characteristics of the crude benzole, and on the number and purity of the products required to meet the market demand.

Figure 4 shows the arrangement of the Wilton pipe still in detail. From observations from a plant in service an estimate of the cost of production of benzole by this process can be compared with the conventional process. The plant under observation was part of a coke oven plant carbonising 1,000 tons of coal per day, and the figures are based on the volume of oil in gallons circulated per ton of coal carbonised, and in both cases the capital and labour costs were substantially the same.

	Steam Process	UCB-Wilton Process
High-pressure steam ...	£20,200	—
Low-pressure steam ...	5,400	1,350
Pipestill fuel oil	—	9,500
Power	600	1,000
Total	£26,200	£11,850

The UCB-Wilton process is thus seen to give an annual saving of £14,350 per thousand tons of coal carbonised per day.

New Underground Borer Will Not Disturb Road Surface

By JOHN GRINDROD, B.A.(Com.).

CLAIMED to be an invaluable aid in the laying of under-road power and telephone cables, water pipes, or gas pipes without disturbing the road surface, a new horizontally-operated auger is now being used extensively in Australia by the Commonwealth of Australia Postmaster-General's Department. It has been developed by Proline Manufacturing Ltd., Adelaide, South Australia, with the assistance of the Postmaster-General's Department; and, as well as avoiding disturbance of the road surface, it is resulting in a very substantial saving in time, manpower, and costs.

As operated by the Australian Postmaster-General's Department, this new boring machine is driven by a simple coupling to the power take-off shaft of a Ferguson tractor. The tractor also tows the auger, mounted on its own trailer from job to job. A second trailer, carrying tools, auger sections, and necessary parts is also coupled behind the tractor, thus providing a self-contained unit which travels with all its equipment from place to place.

The auger trailer has an arched axle on which the machine is underslung and is so balanced as to be easily manœuvrable by two men. The trailer is also equipped with a hand winch by means of which the auger can be raised or lowered, the trailer straddling the trench in which the machine is to operate and being withdrawn when the auger is correctly positioned.

Such a trench, 10 ft. 6 in. long by 18 in. wide and 8 in. deeper than the hole to be bored has hitherto been excavated by a small air compressor which has also been used for locating buried water or gas mains so that the machine can be set up without damaging such other services. It is now, however, proposed to fit a small vertical boring machine to the rear of the same Ferguson tractor and to use this for excavating the hole for the machine and for locating water pipes, etc. It is anticipated that this will further reduce the total time for completing the under-road crossings and will release the compressor for other urgent work.

Application for Rights

This road boring machine has been adapted from a Proline vertical boring machine by Mr. C. Rogers, a Divisional Engineer of the Postmaster-General's Department, in co-operation with Mr. R. A. Lines, Manager of Proline Manufacturing Ltd.,

The new Auger fitted with shaft for coupling to tractor.

Croydon, S.A., and an application for patent rights has been lodged with the Commonwealth Patents Office.

The trench having been excavated on the line of bore, the first section of the auger, with cutters attached, is fitted to the auger shaft and advanced to the work face. The base is lined up by sighting with plumb bobs and finally tightened very securely in position by adjustments to screw jacks, which press on timber battens placed against the side walls of the trench at the front and rear of the machine. Boning rods are held on the front of the auger and the rear of the machine

(approximately 10 ft. apart). The elevation is adjusted by undoing four clamping bolts and tilting the boring head in relation to the base.

Obstacles such as water and gas mains, electric light cables, etc., are located, first by search of records, and, if any uncertainty then exists, by digging on the line of bore. Boning rods are held on these obstructions to ensure that the auger will not strike them. Where any doubt exists the auger can be watched as it passes under or over the obstruction. No instruments are used for this, and it is said to give accurate results, but special precautions are taken to earth the machine frame and provide the operator with rubber boots when boring in the vicinity of power cables. It is thought, though, that little danger exists because the continuous flight auger is in contact with earth throughout its full length.

Since the telescoping drive shaft is reversible the machine can be driven by tractors with 1¼ in. or 1¾ in. splined P.T.O. Two men only are essential for operating the machine. One drives the tractor and one man feeds the machine by means of a feed wheel, couples augers, and removes dirt. A third man could couple augers, etc., if required.

In sandy loam and in gravel a 7½ in. hole has been bored at a rate of 45 secs. for each 3 ft. length, with approximately one minute for fitting the next section. The normal rate of boring in hard, dry clay or limestone marl is about 1 ft. per minute and about one minute for adding each section. Rock of hardness up to 4.500 on MOH scale depending on abrasive qualities can be penetrated.

In wet clay a special clay auger must be used otherwise clogging and jamming will result. Where rock is encountered the auger is driven slowly (approximately 30 r.p.m.) and heavy pressure maintained on the feed. Several pockets of rock, sandstone, limestone, quartz, and quartzite have been bored successfully, and a clean round hole, 7½ in. in diameter, has been bored through a concrete manhole wall 10 in. thick. A hole 21 ft. long has been drilled through solid sandstone. Asbestos cement pipes with collars O.S. diameter 7 in. are easily pushed through the hole and so far it has not been necessary to fill the space between the pipe and the hole.

A wooden nose piece is fitted into the front end of the pipe to raise the end to collar level and prevent the entry of dirt. Pipe joining is usually effected by rubber rings.

Accuracy in homogeneous soils has been excellent, usually within 6 in. over 40 ft. to 50 ft. In one case, where rock was encountered, deflection up to 18 in. occurred, but this was not serious as pipes were inserted easily and the location was not critical.

Reamers

Reamers can be used additionally to open up a hole to a required greater diameter, than that made by the auger. First the ordinary auger is put through to ensure correct alignment of the large hole. The auger is then retracted and the reamer put on in place of the cutting head. This opens up the hole as required and the flights of the extension augers keep bringing out some of the spoil, usually leaving the hole less than half full. When the reamer has gone right through it is retracted, still rotating in the normal way.

The design of the reverse side of the reamer is such that it will break up the soil and lift it into the small diameter extension auger, preventing the hole from choking up. The reamer also cleans the hole completely. If the soil becomes compacted the reamer which has cutters on both ends, will dig itself out, if necessary. Drilling forwards it will also bore most stone.

The Australian Postmaster-General's Department says that on a recent test under good conditions a 7 in. diameter hole was bored at 3 ft. 6 in. depth under a new bitumen road in exactly 30 minutes. The length bored was 35 ft. The total time spent on the job was approximately 32 man-hours, including travelling, pipe laying, filling-in, etc. Excavation and filling would have taken at least twice, probably three times, as long. In addition there would have been the cost of reinstating a new road.

When this Department wrote to the writer on July 2, 1956, the self-contained trailer unit had just returned from a country tour during which five crossings of major roads had been completed and nearly 100 miles had been travelled in five-and-a-half working days. One man drove the unit and he was assisted by local line parties at the places he visited.

Extensions to Bright Annealing Plant

NEW electric furnaces have recently been added to the plant installed at the Courtybella works of Whitehead Iron & Steel Co. Ltd. for bright annealing coiled steel strip. This installation is now the largest of its kind in Europe. It totals 37 vertical cylindrical furnaces and 248 annealing containers, all designed and supplied by the General Electric Co. Ltd.

The first furnaces, installed more than 20 years ago, were used for the Grunewald bright annealing process. The charge was sealed in a container and during the initial heating period air was expelled through a non-return valve due to expansion and to the vaporisation of the rolling lubricant left on the strip. The cooling of the charge was thus carried out in a partial vacuum, the bright finish depending upon the absence of an oxidising atmosphere. Although a perfect and uniform anneal was obtained the finish was not consistently good and the G.E.C. therefore decided to introduce a controlled artificial gas atmosphere, generated from ordinary town's gas, in subsequent installations. When further furnaces were installed the containers were modified to permit the use of a controlled atmosphere. Since then the quality and uniformity of the anneal and a superior bright finish have been consistently maintained.

Two Parts

The bright annealing plant is arranged in two parts. The first one was completed in 1940 by which time 13 G.E.C. vertical cylindrical furnaces, with a full complement of annealing containers, had been installed. These furnaces take annealing containers with effective loading diameters ranging from 20 in. to 44 in. The bright annealing atmosphere is supplied from G.E.C. town gas burners installed in a central gas station.

In the second part of the installation there are 16 furnaces which have been in operation for ten years. These furnaces take containers 74 in. deep with effective loading dimensions of 36 in. and 44 in. Now eight more G.E.C. vertical cylindrical furnaces have been added to bring the total to 24 which, with recuperator pits to house 48 containers and cooling pits to house 96 containers, occupy a floor space of nearly 16,000 sq. ft. The eight new furnaces are each rated at 150 kW and take containers with effective internal dimensions of 44 in. diameter and 86 in. depth.

Control of Temperature

The furnaces are heated by heavy gauge nickel-chrome wire elements, arranged in coil form and placed circumferentially round the inside wall of each furnace in grooved refractory material. These elements are arranged in two circuits with alternate coils in each circuit. One circuit is arranged to cut out just before the required furnace temperature is reached. This 50% reduction in power input gives fine control of temperature, while still maintaining a uniform heat distribution in the vertical plane. Gold excess temperature fuses are fitted in each element circuit, these fuses being connected in series with a safety switch fitted to each furnace top to ensure that the element supply is disconnected when an annealing pot is removed.

The 24 furnaces are served by six automatic temperature control panels each controlling four furnaces, and recording their charge temperatures.

A feature of the annealing containers used with these furnaces is the method of supporting the charge which is stacked on a base casting of heat resisting cast iron. This casting is then suspended from the pot-head by heat-resisting suspension bars. The weight of the charge being thus carried by the pot-head, the body of the container can be made of light

General view of the second part of the installation of G.E.C. vertical cylindrical furnaces at the Courtybella works. This part includes 24 furnaces and 144 containers. Six automatic temperature control panels serve the second part of the installation. Each panel controls four furnaces and records their charge temperature.

gauge heat-resisting steel to promote a rapid heat transfer from the furnace to the container and hence to the charge.

A gas tight seal is effected between the container and the head by means of a rubber ring, kept cool by water flowing in a channel round the top of the container.

Heat recuperation is an important feature of both the installations, the heat content of containers newly removed from the furnaces being used to preheat freshly loaded containers. The preheating is carried out in brick lined recuperator pits, each accommodating two hot containers cooling down and two newly charged containers to be preheated. The hot containers are placed diagonally opposite each other. A considerable economy in electricity consumption is effected in this way.

Charged containers are purged of air during preheating and a flow of controlled atmosphere is maintained throughout the heating time. The furnaces are controlled at a temperature between 750°C. and 800°C. Heating time varies according to the weight of a charge and the wall thickness of the coils, a typical figure being 12 hours for a 4½ ton charge.

The controlled atmosphere for the complete installation is supplied by G.E.C. plant installed in a central gas station. The total atmosphere consumption is some 4,500 cu.ft. per hour, and this is supplied by three burners. Two further gas burners are installed to permit adequate maintenance to be carried out. The pipework is so arranged that any of the burners may be used with any compressor.

In the past the works have not closed during the annual holidays and both installations have operated continuously since their erection. Last year with the closing of the works, the early part of the installation had its first complete shut down in 20 years. In all this time none of the steel strip treated in the G.E.C. furnaces has been rejected due to faulty annealing.

CANADIAN TRADE

THE phrase 'CABMA Register, 1956-57, of British Products and Canadian Distributors,' speaks for itself; the latest issue (42s. plus 2s. post, Iliffe and Sons, Ltd.) has just been published. The book provides a directory, in fact, of what British manufacturers can supply. It is published annually for the Canadian Association of British Manufacturers.

ASSOCIATION TECHNIQUE—from p. 455.

and Delsol, Director and Joint-Director of the Department. M. Bolzinger addressed to the visitors an account of the origin and fundation of the laboratories and a description of their work and equipment.

At the coking plant, Paris-South, at Alfortville they were received by M. de Sacy, Chief of the Paris Group No. III, who explained the role of the Alfortville coke oven plant in the supply of gas to the Paris Region, and M. Rigoulot, Chief Engineer, gave details of the construction and other works in hand. Gas for the Paris Region is produced at three principal centres of which the works at Cornillon and du Landy would be eventually shut down. These coke ovens would then be the principal source of supply with production also at Gennevilliers and Villeneuve-la-Garenne, supplemented by supplies from Lorraine. Gas consumption in Paris had reached the annual figure of 1,400 mill. cu. m. (36,700 mill. cu.ft.) with a maximum daily demand around 7 mill. cu. m. (247 mill. cu.ft.). The three Parisian works could supply daily 6 mill. cu. m. (212 mill. cu.ft.) consisting of 2.7 mill. coke oven gas and 3.3 mill. peak load gas. The Lorraine coke ovens supplied 1 mill. cu. m. (35.5 mill. cu.ft.) of gas per day.

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/6d.; by post 1/8d.

Subscription Rates: Home and Empire:—60/- per annum; Foreign:—70/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/6 per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN & MIDLANDS REPRESENTATIVE: A. Engelhardt, T.D., 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

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FOR SALE.—Ex Stock—Electrostatic Precipitator by Simon-Carves Ferranti to 40,000 volts—375 Milliamps D.C. Unused or very little used. Can be viewed in Manchester—£1,250. Address: No. 290. *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

APPOINTMENTS VACANT

LONDON COUNTY COUNCIL

WESTMINSTER Technical College, January, 1957. Two teachers with industrial experience and University degrees or H.N.C. for sandwich course for gas engineers. To teach (1) Mechanical Engineering Subjects, (2) Chemistry and Physics. Teaching experience desirable. Experience of industrial processes, e.g., Gas Manufacture an advantage for post (2). Burnham F.E. Salary Scale, assistants Grade B, £686-£1,273. Individual maximum and starting salaries according to qualifications and experience. Application forms from Principal at College, Vincent Square, S.W.1, to be returned by September 10, 1956. (1605)

ACCOUNTANT, preferably qualified and aged about 25-35; required for Public Utility Company in Hong Kong. Commencing salary £1,200 or more according to experience and ability. Cost of living allowance £560 (single), £935 (married). Free passage, quarters, medical attention. Pension Scheme. Single man preferred. Write F. W. Edwards, U.K. Agent, 148, Gresham House, Old Broad Street, London, E.C.2.

COALITE AND CHEMICAL PRODUCTS LTD. invite applications for the position of SHIFT SUPERVISOR at their large Carbonising and By-Product Plant at Bolsover. A Superannuation Scheme is in operation, and the successful candidate will have a concessionary Fuel allowance.

Applicants, who should preferably have had experience on Carbonising and By-Product Plants, please write in first instance giving details of age, experience and salary required to:—Coalite and Chemical Products Ltd., Post Office Box No. 21, Chesterfield, Derbyshire.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION
LEAMINGTON SPA AND WARWICK DISTRICT
SENIOR TECHNICAL ASSISTANT

APPLICATIONS are invited for the above position at a Works having a production capacity of five million cubic feet of gas per day.

Candidates should hold the Higher Grade Certificate in Manufacture of the Institution of Gas Engineers. They should possess practical experience of the operation of vertical retort installations, C.W.G. plant and normal gas works ancillaries, and should be experienced in carrying out all usual gas works tests.

The salary will be within A.P.T. Grade 7 of the National Salary Scales for Gas Staffs (£670-£750 per annum). The post is pensionable, and the successful candidate may be required to pass a medical examination. A house will be available at a reasonable rental.

Applications stating age, qualifications, and experience, and giving the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Warwickshire Division, Gas Street, Coventry, to reach him not later than September 1, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
WALSALL DISTRICT

APPLICATIONS are invited for the following appointments, which arise from the commissioning of a new works at Walsall having a daily production capacity of 12 million cu.ft. of Coal Gas, and 6 million cu.ft. of Carburetted Water Gas.

1. MECHANICAL AND ELECTRICAL SUPERINTENDENT.

The successful applicant will be responsible for supervising the work of craftsmen and men engaged in maintaining the whole of the mechanical and electrical equipment on the new works, together with the section of men maintaining motor vehicles, and mobile plant.

Candidates should have experience in the control of labour, and in the maintenance of large scale conveying equipment, steam-raising plant, prime movers, and electrical switchgear.

Possession of the Higher National Certificate in Mechanical or Electrical Engineering would be an advantage.

The salary for the post will be within A.P.T. Grade 10 (£820-£920 per annum) of the National Salary Scales for Gas Staffs.

2. SHIFT SUPERINTENDENTS—THREE VACANCIES.

The successful applicants will be required to operate six shifts per week on a rota system, and will be responsible for the supervision of shift labour and the practical operation of the production plant, which will comprise continuous vertical retorts, automatically-operated carburetted water gas plants, together with normal purification and ancillary equipment.

Candidates should have experience in the control of labour and have a general knowledge of Gas Works' routine production.

The salary for the post will be within A.P.T. Grade 9 (£755-£855 per annum) of the National Salary Scales for Gas Staffs.

3. RELIEF SHIFT SUPERINTENDENT.

The successful applicant will be required to act as relief to the Shift Superintendents, and to three Carbonising Foremen, one of whom will be employed on each shift. The latter will be responsible for detailed supervision of two continuous vertical retort houses.

The salary for the post will be within A.P.T. Grade 8 (£710-£790 per annum) of the National Salary Scales for Gas Staffs.

4. ASSISTANT WORKS CHEMISTS.

The successful applicants will be responsible for the testing of coal, coke, oxide and raw materials, and for assisting in the chemical control of the production plant.

Possession of the Ordinary National Certificate in Chemistry, or equivalent qualification, would be an advantage.

The salary for the post will be within A.P.T. Grade 7 (£670-£750 per annum) of the National Salary Scales for Gas Staffs.

The appointments are pensionable, and the successful candidates may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Division No. 3, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than August 31, 1956.

J. C. INGRAM,
Secretary to the Board.

(*Classified advertisements continued on page* 474)

APPOINTMENTS VACANT (ctd.)

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
APPOINTMENT OF HOME SERVICE ADVISER OR TRAINEE AT LINCOLN

APPLICATIONS are invited from suitably qualified persons for the above appointment. Candidates must hold a recognised Diploma in plain cookery and/or domestic science and be capable of promoting the use of gas appliances and of advising consumers on kitchen and other domestic problems involving the use of gas.

Consideration will be given to accepting a young lady as trainee providing she has successfully completed a course of study in domestic science.

The salary will be within Grades S.G. 4/5 or the Common Junior Staff Scale, of the National Salary Scales for Gas Staffs (£247/£580 p.a.) according to age, qualifications and experience.

The successful candidate will be required to pass a medical examination and will also be required, if eligible, to join the Board's Staff Pension Scheme.

Applications stating age, qualifications and experience and giving full particulars of training, together with the names of two referees, should be addressed to the undersigned to arrive not later than September 1, 1956.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

August 13, 1956.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
DISTRICT REPRESENTATIVE, SKEGNESS

APPLICATIONS are invited from persons with a good knowledge of gas fitting and of gas and coke appliances for appointment as DISTRICT REPRESENTATIVE at Skegness.

Candidates should be capable of advising domestic consumers on matters relating to the use of gas and coke, and of maintaining good consumer relations. The successful candidate will be primarily responsible for the promotion of appliance sales and advising on and estimating for domestic installations, but will also be required to investigate disputed accounts and other queries received from consumers.

The appointment will be made within Grades APT. 4/5 (£445/£655 p.a.) of the National Salary Scales for Gas Staffs, the commencing salary being determined by the experience and qualifications of the person appointed.

The post is pensionable, and the successful applicant will be required to pass a medical examination.

It is anticipated a modern house will shortly become available if required.

Applications stating age, education, qualifications and giving full particulars of training, together with the names of two referees, should be addressed to reach the undersigned by not later than September 1, 1956.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.
August 13, 1956.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
DISTRIBUTION ENGINEER—WELLINGBOROUGH GROUP

APPLICATIONS are invited for the post of DISTRIBUTION ENGINEER, Wellingborough Group. The appointment will be made within Grades APT. 11/12 (salary range £850/£1,025), and the salary at commencement will be dependent upon the qualifications and experience of the person appointed.

Applicants, who should possess the Higher Grade Certificate in Gas Engineering (Supply) of the Institution of Gas Engineers, or its equivalent, must have had considerable experience in a modern Gas Distribution Department and should be competent to supervise systems involving the use of low, medium and high pressure mains with district holders.

The Distribution Engineer, who will be required to reside in or near Wellingborough, will have overall responsibility for the distribution function within the Group, which comprises the Wellingborough, Rushden and Kettering/Corby districts with approximately 45,000 consumers. He will also be responsible for Holder Stations and general property repairs and maintenance in the Group.

The post is pensionable, and the successful applicant will be required to pass a medical examination. Applicants stating age and giving details of education, qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than September 8, 1956.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
APPOINTMENT OF GASFITTING FOREMAN

APPLICATIONS are invited for the position of GASFITTING FOREMAN in the Grimsby Group. Applicants must possess a City and Guilds First Class Gasfitter's Certificate.

The salary payable will be within Grade A.P.T. 4a of the National Salary Scales for Gas Staffs (£535/£615) according to experience.

The tenancy of a Board house at a reasonable rent is available if required.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, experience and present position, together with the names of two referees should be addressed to the Group Manager, East Midlands Gas Board, Sheepfold Street, Grimsby, to arrive not later than September 8, 1956.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
ACCOUNTING ASSISTANT—LINCOLN GROUP

APPLICATIONS are invited for the post of ACCOUNTING ASSISTANT of the Lincoln Group at a salary within Grades APT. 6/7 of the National Salary Scales for Gas Staffs (£610/£750 p.a.). The commencing salary will be determined by the experience and qualifications of the successful applicant.

Candidates preferably should either possess or be studying for a professional accounting qualification, and in the latter case have passed the intermediate examination.

The post is pensionable, and the successful applicant will be required to pass a medical examination.

Applications stating age, education, qualifications and details of experience together with the names of two referees should be addressed to reach the undersigned by not later than August 25, 1956.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

August 13, 1956.

SCOTTISH GAS BOARD

FIFE GROUP
GROUP TECHNICAL ASSISTANT, P.A. CONTROL

APPLICATIONS are invited for the position of GROUP TECHNICAL ASSISTANT, P.A. Control, to the Fife Group.

The salary will be Grade A.P.T. 7/9, Provincial 'A,' minimum £670, maximum £855, with placing according to qualifications and experience.

Candidates should have experience in Gas Engineering and possess the Higher Grade certificate in Gas Engineering (Manufacture). Experience in Vertical and Horizontal Retorts will be an advantage.

The post is pensionable, and the successful applicant may be required to pass a medical examination.

Applications endorsed "Group Technical Assistant" giving full particulars of age, qualifications and experience, together with copies of three recent testimonials, or names and addresses of three referees to whom reference can be made, to be lodged with the undersigned not later than August 30, 1956.

DAVID L. DICKSON,
Group Manager.

Gas Offices,
Grange Road,
Dunfermline.

SCOTTISH GAS BOARD

APPOINTMENT OF DISTRIBUTING ENGINEER

APPLICATIONS are invited for the position of DISTRIBUTING ENGINEER to the Board. Applicants must possess the necessary technical qualifications and must have had wide experience of gas distribution including the planning and design of grid systems.

The salary payable will be within the scale £1,850-£2,150 per annum with placing in accordance with qualifications and experience.

The post is pensionable; the successful applicant will require to pass a medical examination and to reside in or near Edinburgh.

Applications stating date of birth and giving details of education, training, qualifications and experience, together with the names of two referees, should be lodged with the undersigned within fourteen days of the publication of this advertisement.

A. T. HERD,
Secretary.

26, Drumsheugh Gardens,
Edinburgh, 3.

EASTERN GAS BOARD

NORWICH DIVISION
THETFORD DISTRICT

FIRST CLASS GAS FITTER required for above Undertaking. Full J.I.C. rates (Pro /inc 'A') and conditions of service.

A house will be available on a service tenan y f a period of two years, or until the successful app cant can find accommodation within that p erio The successful candidate will be required to pass medical examination.

Applications, giving details of age, present dut and references, should be made to the under sign within fourteen days of the appearance o th advertisement.

L. C. B. WILLIAMS.
Manager, King's Lynn Grou

Eastern Gas Board,
Wisbech Road,
King's Lynn,
Norfolk.

NORTH WESTERN GAS BOARD

LIVERPOOL GROUP
ENGINEERING DRAUGHTSMAN

APPLICATIONS are invited for the above pe sionable appointment at a salary within Grad A.P.T. 7/8 (£670/£790 per annum).

Applicants should be of good general educati and have reached at least Higher National Certific standard. Experience in any of the following wou be an advantage—design and construction of gaswor or allied plant, pipe work, pumps, vessels and stea utilisation and steel structures or mechanical handli plant. A knowledge of electrical engineering wou be considered an additional advantage.

Application should be made in writing to the Ch Personnel Officer, N.W.G.B., Liverpool Grou Radiant House, Bold Street, Liverpool, 1, within days.

MARKETING OFFICER required by N.C.B Marketing Department in London as Assistant Head of By-Products Section. Knowledge of t benzole and ammonia is essential; the successful c didate must be capable of deputising for the He of the Section and be able to represent the Boar interests at trade meetings. Appointments (sup annuable), within inclusive scale £1,159 to £1,5 male, according to qualifications and experience.

Write, with full particulars of age, educati qualifications and experience to National Coal Boa Staff Department, Hobart House, London, S.W marking envelope SS/373, before August 30, 1956.

EAST MIDLANDS GAS BOARD

COMMERCIAL MANAGER

APPLICATIONS are invited for the appointm of COMMERCIAL MANAGER to the Bo at a commencing salary of not less than £3,000 annum, according to qualifications and experien

The Commercial Manager's Department inclu sections dealing with marketing, economic resear appliance research, central contracting for applian and materials, and public relations (including pr and publicity).

The post is pensionable and the successful ap cant will be required to pass a medical exam natio

Applications stating age, education, qualificati and experience, together with the names addresses of two referees, should be forwarded reach the undersigned not later than Monday, S tember 17, 1956.

A. GWYNNE DAVIES.
Secretary.

Beverley House,
University Road,
Leicester.
August 20, 1956.

SOUTHERN GAS BOARD

ISLE OF WIGHT GROUP
HOME SERVICE ADVISER

APPLICATIONS are invited for the position HOME SERVICE ADVISER in the Isle of Wi Group. The starting salary will be between £400 £500 per annum, according to experience.

Applicants should have completed at least years full-time training at a college of Dom Science, recognised by the Ministry of Educati and should hold the Diploma of that college. National Council of Domestic Science Diploma or National Council for Domestic Studies Demonstra Certificate or alternatively, should hold the Insti tional Management Diploma or be a trained teac in Domestic Science after completing a three y full-time course.

The position is pensionable, and the succes applicant will be required to pass a medical exam tion.

Applications stating age, education, qualificati present appointment and previous experience, to with the names of two referees, should be a ldre to reach the undersigned within 14 days of the of this notice.

P. VALON BE NET
Personnel Man ger

164, Above Bar,
Southampton.

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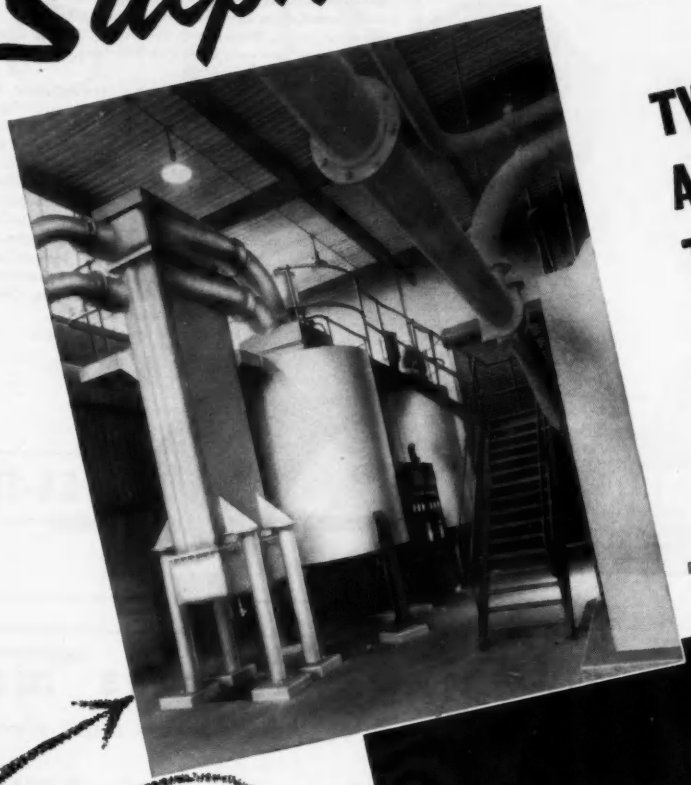

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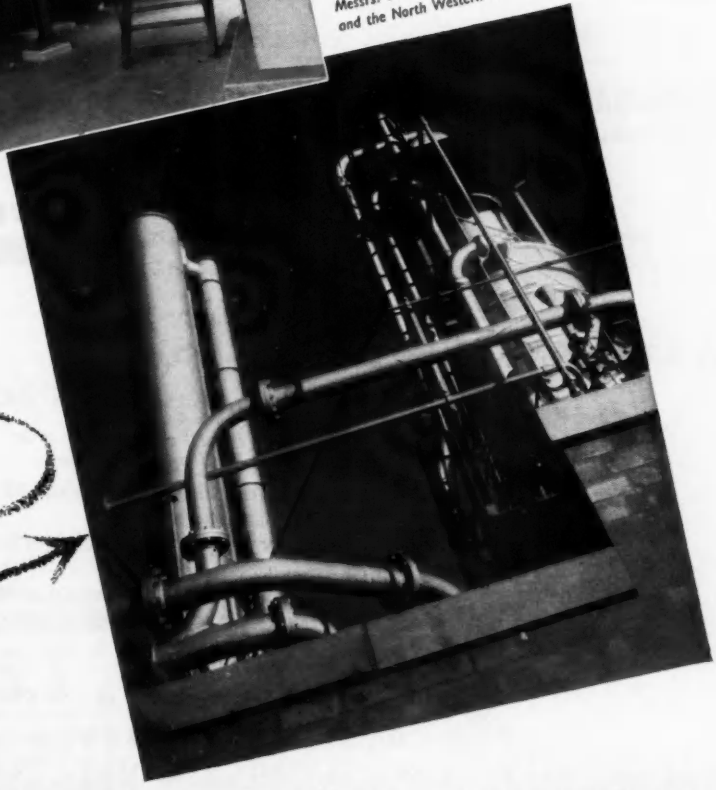
Catalytic Treatment of Gas



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The "Tornado" method of man-cooling definitely courages production all the time. Man-cooling fans deliv for as long as is necessary, a brisk, cooling air current wh relieves excessive body heat and improves breathing c ditions. Designed particularly for use in the "heat trades they combine an easy portability with rob construction — two essential characteristics.

If your concern is for workers in iron and st works, foundries, boiler houses, gas retort hou glass works or "lighter" industries where ef iency is bound up with the maintenance of co fortable working conditions then you sho see Publication No. 9/7.

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REAVELL & CO. LTD. IPSWICH.

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WALTER KING, LTD. 11, BOLT COURT, FLEET STREET, LONDON, E.C

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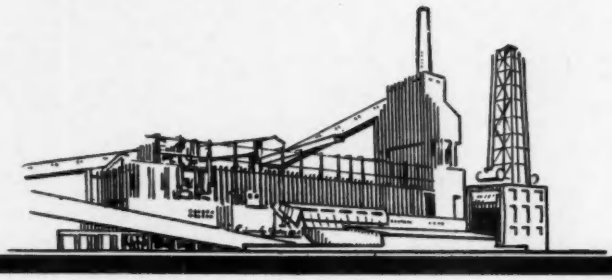
COLLIN coke ovens



In the Collin System each oven is heated by primary combustion alternately from the top and bottom of the combustion chamber in half-hourly cycles, thereby ensuring even heating of the oven walls and producing constant coke quality throughout the depth of the charge

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London: Columbia House, Aldwych, W.C.2. C.O.L. Division: Chandos House, Buckingham Gate, S.W.1.

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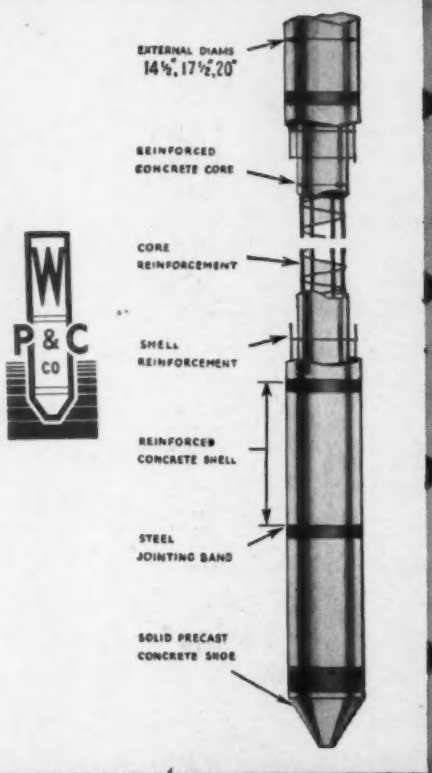

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London : Columbia House, Aldwych, W.C.2.
Midlands : 63 Edmund Street, Birmingham 3.
North : Albion Ironworks, Manchester 10.
Scotland : 169 Hamilton Road, Glasgow, E.2.
Australia Office : 247 George Street, Sydney, N.S.W.
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